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ABSTRACT

Research investigated whether cognitive learning scores and perceptual distortion measures of basic airmen would be influenced by instructor rank. Four groups of students, each composed of high, medium and low ability individuals, were created; each viewed a 20 minute television lesson on how to study. They differed only in that each was taught by a different instructor--a basic airman, a sergeant, an officer or a civilian. It was hypothesized that the sergeant would be most consistent with the students' expectations and that hence his group would experience the least cognitive dissonance, learn the most and exhibit the least perceptual distortion. Posttest results, however, showed no significant differences in either learning or distortion, and it was concluded that rank did not create differences in the televised instructional situation. Studies of other instructor variables, students, content, and instructional media were recommended. Investigations of whether the instructor's rank involves the student's ego, of the degree to which dissonance varies over the length of exposure to another person and with instructional media, and of whether or not dissonance occurs in situations like these where students are required to participate, were also suggested. (PB)

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Wright-Patterson Air Force Base, Ohio

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EFFECT OF INSTRUCTOR MILITARY RANK ON LEARNING AND PERCEPTION OF BASIC AIRMEN TAUGHT THROUGH THE MEDIUM OF TELEVISION

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A School of Systems and Logistics Technical Report

Air University

Air Force Institute of Technology

Wright-Patterson AFB, Ohio

By

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June 1973

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CHAPTER I

BACKGROUND AND JUSTIFICATION FOR THE STUDY

Introduction

Although group norms affect student expectations, perception and attitude toward the learning situation (Berelson and Steiner, 1964; Wiman and Meierhenry, 1969; McDavid and Harari, 1968), there is little evidence about whether these factors would in turn effect cognitive learning. In an ERIC document, Gage (1966) stated:

> There has been no major research comparable to research on the social and emotional aspects of teaching, which focuses on teaching behavior as related to student achievement of cognitive objectives [Eric Document resume].

The concept underlying this study was to seek an interaction between these affective and cognitive elements of learning. The affective element was based on a group norm. The cognitive element was based on an achievement test. A student expectation assumed by the author as being commonly held and therefore a group norm is that individuals manifest an average expectation toward instructor status relative to a given course of instruction. The expectation may be strong enough to adversely affect cognitive learning when students are taught by instructors that are inconsistent with that expectation. The expectation in terms of a group average will be referred to as a group norm.

To address the question, the theory of cognitive dissonance was used as the theoretical basis to develop an experimental model. The

model called for television programs, a closely matched opulation and an instrument to test for differences in both the cognitive and affective elements mentioned above.

A television lesson script was completed on the topic, "How To Study." Four of these twenty minute television programs were recorded on video tape. The only differences within the tapes were the military rank of the instructor. These treatment variables were Air Force Airman, Technical Sergeant, Lieutenant Colonel and a business suit typical of a United States Civil Service employee.

The subject population consisted of basic airmen at Lowry Air Force Base. Qualification as a subject involved a two step process. Potential subjects were required to meet both matching and stratification criteria. Failure to meet either resulted in disqualification. The matching criteria consisted of general population parameters in terms of age, sex, educational achievement level and length of time served in the United States Air Force. The stratification criteria consisted of achievement scores in intelligence and aptitude tests. These scores were used to place subjects into high, medium and low ability groups or strata.

An instrument was devised to test the cognitive and affective elements. Group scores of a forty-two item post-test instrument over the how to study television lesson was used as the criterion variable of the cognitive element. The criterion variable was used to suggest if there were differences in cognitive learning within groups corresponding to the treatment variables consisting of different instructor ranks.

Opinion questions were devised to test the affective element. The perceptual distortion indicates were merely the three opinion questions based on a five point Likert type scale. They were inserted at the beginning of the forty-two item cognitive test. Each question was designed to reflect student perception from a very positive to a very negative reaction. These perceptual distortion questions were designed to indicate differences in perception of television as a medium of instruction, the instructor as a teacher, and the subject material of the televised lesson.

The perceptual distortion indicates were used as analytical variables for the affective element. The perceptual distortion indicate scores served several purposes. First they were intended to suggest whether cognitive dissonance was present relative to a particular treatment variable. Second, the differences were intended to suggest a group norm in terms of identification with a particular treatment variable of instructor status.

The model was designed to detect differences in learning and perception within treatment variables by ability level stratum and combined strata. Inspection of the statistical results would reveal that the same cell of subjects had scored significantly different in terms of both cognitive and affective elements. Cells having significantly higher cognitive element scores would have significantly more favorable affective element scores. Cells having significantly lower cognitive element scores would have significantly more unfavorable affective element scores.

Statement of the Problem

The purpose of this study was to determine whether cognitive learning scores and perceptual distortion indicates of United States Air Force basic airmen would be affected by utilizing educational television instructors of different Air Force rank.

Justification

Military Education and Training. An obvious variable inherent in Air Force instructional television productions is the strength of identification possibility associated with the rank of the instructor. Whether this in turn would affect learning is a matter of practical concern.

In keeping with these practical considerations, support for this study was provided by two sources. Television production facilities, the loan of two inch video tapes, test forms and the use of an optical scanner and computer services were provided by the Air Force Academy. In March, 1970, the Human Resources Laboratory secured authority from Headquarters, Air Training Command to conduct the experiments and provide access to the personnel records at Lowry Air Force Base.

Instructional Television. The literature about educational television suggests the need for non-comparative studies within the medium of television itself. The results of a recently completed study at Lowry Technical Training Center (1968:27-28) indicates that educational television research has been centered almost exclusively on comparing television with other media of instruction. Research reveals that educational television is neither the panacea for all educational problems nor the doom of the human and personal element in the profession of

education. There appears to be little need or justification for additional studies which compare conventional versus educational television methods of instruction. However, educational television as a medium of instruction is almost totally dependent, at this time, upon intuitive trial-and-error experimentation without analytical controls. Television as a separate medium lacks a firm empirical basis. Therefore, the most promising path is not more redundant studies, but research focused toward improving the educational efficiency of the television medium itself without reference to other media of instruction.

Chu and Schramm (1967) arrived at a similar conclusion:

> For one thing, it has become clear that there is no longer any reason to raise the question whether instructional television can serve as an efficient tool of learning . . . The questions worth asking are no longer whether students learn from it, but rather, (1) does the situation call for it, and (2) how, in a given situation, can it be used effectively [98]?

A review of instructional television literature testified that this study was almost unique as non-comparative research wholly within the medium of television and directed toward the efficient use of television in a given situation.

Learning Theory. The model for this study was designed to test some aspects of learning theory as it may be associated with perception. It was designed around Festinger's (1957) theory of cognitive dissonance to predict the interaction of cognitive learning achievement and perceptual distortion. The model could be applied to a variety of contemporary issues that involve race and the underprivileged classes of society regarding their group norms and resultant expectations toward the teacher and the learning environment.

Research in the affective areas of learning indicates that group norms affect student perception (Berlson and Steiner, 1964; Wiman and Meierhenry, 1969; McDavid and Harari, 1968). But perception was also of interest to researchers on the cognitive side of learning. In his book Theories of Learning, Hilgard (1956) identified special areas in which research was needed to either prove or repudiate all major learning theories:

> The problem of perceptual discrimination is a central one for learning theory. There is some uncertainty as to the manner in which perception is natively organized . . . The perception of objects suffices to show that there is at least some learning [reflected] in perception. A cake of ice looks cold; the red tip of a poker looks hot. The properties of cold and hot, not present to the senses [heat sensors] are present in [visual] perception as a result of prior experiences. They are not judgments or deliberate inferences from perceptual data, but are given as immediately as any of the properties of perceived objects [465-466].

In his book, A Theory of Cognitive Dissonance, Festinger (1957) provided a theory that possibly could be adapted to predict for the interaction of cognitive achievement and perceptual distortion. When applied correctly, the theory perhaps would help to bridge the gap between the relationships of some affective and cognitive elements of learning.

According to Festinger's theory, every individual has non-specific activating properties which the author will refer to as psychic energy. People use psychic energy to drive or continually strive for an orderly and meaningful understanding of reality. Through experience they learn to expect reality to be in consonance. This means to be in balance or internally consistent. When there is dissonance, psychic energy is directed toward the restoration of cognitive balance. The cognitive

experiences are interrelated in such a manner as to be consistent or balanced with the totality of experience. Thus, for example, perception, attitude, and learning are not unrelated but are part of an overall personality organization.

Dissonance reduction may be accomplished by either physically or psychicly avoiding situations in which dissonant stimuli occur. Psychic avoidance may be accomplished by resorting to perceptual distortion.

Chapter 2

THEORETICAL MODEL

The Concept

An individual may learn to expect an appropriate instructor status relative to his perception of a given course of instruction. When instructor status is incongruent with expectations there may be a lower rate of learning and higher perceptual distortion.

Since similar individuals are a product of their experiences derived from a somewhat common society, one would expect that many would manifest similar expectations toward a specific course of instruction. Applying the theory of probabilities to this assumption, one would expect that any group of like individuals would manifest an average expectation toward instructor status relative to a given course of instruction.

Hence by correctly applying this concept, one could experiment to determine the optimum instructor status for any course of instruction relative to a particular group of students. The optimum instructor status would be identified in terms of maximum learning rates and lower perceptual distortion indicates.

The Research Proposition

Festinger's theory of cognitive dissonance formed the basis for

the following proposition: The Technical Sergeant instructor will be more congruent with student expectations than the Airman, Lieutenant Colonel or Civil Service instructors. Student expectations will manifest a group norm in terms of higher learning scores and lower perceptual distortion rates around the Technical Sergeant treatment variable.

Learning would be measured by the criterion variable or group scores on the post-test. Perceptual distortion would be measured by the analytical variables or group scores on the opinion questions. The cognitive element was represented by the criterion variable. The affective element was represented by the analytical variables. The group expectation or norm would prove to be both relevant and strong enough to create cognitive dissonance when subjects are forced into a situation where they must view an instructor who is cognitively inconsistent with their expectations. Since subjects cannot avoid the physical situation, congruence must be attained by perceptual distortion or selection. Some of the psychic energy will be directed toward attaining cognitive balance rather than learning. This energy drain will be reflected in relatively higher perceptual distortion indicates referred to as analytical variables in this study. Other factors being equal, there should be a positive statistical relationship between the more negative perceptual distortion indicates and a decrease in learning. Differences in perceptual distortion would indicate whether dissonance was experienced by subjects within treatment variables. An assumed student expectation or group norm was necessary for prediction purposes.

However, differences in analytical variables within treatment variables would suggest whether there were differences in identification associated with a particular rank and the assumed group norm could be altered accordingly.

Theoretical Issues

Cognitive dissonance theory, as postulated by Leon Festinger in 1957 and as further developed and refined by a number of social psychologists provided a unique paradigm from which to both predict and interpret behavior in interpersonal situations. The theory is particularly valuable when it is able to predict and explain behavior which is not amenable to interpretation by more conventional psychological theories such as when a person perceives an event but literally does not believe it (Brehm and Cohen, 1962).

Cognitive dissonance is a psychological tension having motivational characteristics. The theory deals with the conditions which arouse dissonance in an individual and the ways in which dissonance can be reduced. Cognitions, or cognitive elements, are items of information or knowledges which one has about himself or his environment. The relationship between any two cognitions is consonant if one implies or supports the other in some manner. A dissonant relationship exists between two cognitions when the person possesses one which follows from the counterpart of the other he possesses. Thus, if A implies B, then holding cognition A and the counterpart of cognition B is dissonant. When the individual holds cognitions at any given time, among which there are one or more dissonant relationships, he will experience the motivational

tension of dissonance. Those cognitions which are neither consonant nor dissonant are said to be irrelevant (Brehm and Cohen, 1962). For example, the cognition that it is raining is irrelevant to the cognition that you are eating; unless you were eating outdoors.

In this study it was necessary to determine whether military status (rank) is an ego-involved element sufficient to create dissonance in basic airmen when using television as the medium of instruction. The analytical variables referred to as perceptual distortion indicates were designed to suggest the presence of dissonance if differences were found within the treatment or rank variables. For subject cells where dissonance was present, the learning rate was predicted to be lower.

Dissonance Avoidance

Monaghan (1970) believed that all homeostatic or dissonance concepts have two underlying assumptions. These concepts assume that imbalance creates tension because man imposes meaning on environment consistent with his experiences. Any inconsistency creates tension because man's concept of the world and his ability to affect it becomes imbalanced. The second assumption is that man seeks to reduce or avoid tension by actively seeking the most balanced condition.

Festinger's (1957) assessment was similar. He identified two hypotheses of dissonance theory:

1. The existence of dissonance, being psychologically uncomfortable will motivate the person to try to reduce the dissonance and achieve consonance.

2. When dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and information which would likely increase the dissonance.

Festinger's second hypothesis appears to create ambivalence between dissonance concept and theory. Conceptually, the second hypothesis would not necessarily be a corollary of the first in every situation. Lecky (1951) held that an individual must risk the security he desires and seek inconsistencies in order to learn and develop. Narrow interpretation of Festinger's second hypothesis could create a divergence between the results of controlled experimental studies and what actually happens in non-controlled situations.

In some cases people actively avoid dissonant information. Mills and Jellison (1965) found that " . . . prior to commitment people who are certain that an alternative is the best will avoid information favoring a different alternative [589]." Conversely, Freedman (1965) found that high-confident subjects prefer dissonant information while low-confident subjects prefer consonant information. Mills (1967) found that while subjects seek out dissonance reducing information, they do not avoid dissonance increasing information. Lowin's (1966) work generally supports the hypothesis that dissonant persons desire agreeable information and avoid information with which they disagree. However, he found that a person may choose to approach or refute dissonant information. The choice depends on the perceived ease of message refutation. Easily refuted messages are approached. Stong dissonant messages are avoided. As discussed earlier, one would also suspect that the depth of ego-involvement way play a part in whether dissonant messages would be approached or refuted.

Apparently Festinger's (1957) second hypothesis is not necessarily a corollary of the first, and Lecky's (1951) belief that a person may choose to face dissonance has been supported.

This phenomenon may effect the present investigation. The subject material of the televised lesson could introduce a bias between the strata of ability levels. The low stratum subjects may have less confidence based on past experiences with their perceived ability to study. This would result in different perceptual distortion scores between strata depending on whether there was refutation. The term refutation in this sense is addressed to the question of whether the subjects psychicly choose to engage in or avoid a dissonant situation. Refutation would likely result in lower scores. Non-refutation would likely result in higher scores because the low ability subjects would perceive a need to know more about the subject material how to study. This possible bias would appear within all treatment (status) variables for the low stratum as compared to the medium and high strata. However, a bias possible created by the subject material of the televised lesson should not affect this study because the dependent variable would be compared within status variables rather than between ability level strata. Differences between strata were expected, since these ability level strata were different to begin with. There was no intent to make comparisons between strata except by inspection.

However, neither the status of the instructor nor bias of the subject material may create sufficient dissonance to render refutation and hence dissonance reduction necessary on the part of the subjects. Given the uncertainty over conditions necessary for the avoidance of dissonance, and whether or not refutation would be difficult, the alternative in this case was to develop a model which placed subjects into a possibly dissonant situation and test for differences in learning and perceptual distortion.

The possible affect of commitment in this study was a matter of conjecture. According to the concepts of Lecky (1951), Osgood and Tannenbaum (1955) and Festinger (1957), it would appear obvious that commitment in terms of magnitude to self-image is a necessary a priori to dissonance. They believe that the magnitude of dissonance produced would depend on the importance of the issue to the individual. Importance of the issue would form the basis for an individual's commitment to it. Brehm and Cohen (1962) cited several studies to confirm this phenomena. And Eagly (1967) found that when information was dissonant, highly ego-involved subjects changed less toward the information and evaluated it as less accurate than did the low ego-involved subjects. Therefore, the possible affect of commitment to this investigation was based on an assumption. It was assumed that identification of subjects with the Air Force Technical Sergeant would be ego-involving enough to create dissonance when an unexpected instructor status was presented through the television medium. The experiments were designed to test this assumption. If the assumption was correct, it was predicted that perceptual distortion indicates of subjects viewing television programs with instructors of unexpected status would be higher than the distortion indicates of those subjects who had viewed the television program in which the instructor status was congruent with student expectations.

According to Brehm and Cohen (1962), the second ingredient necessary for the arousal of dissonance was volition. Volition is related to the controversy over Monaghan's (1970) and Festinger's (1962) second assumption which was discussed earlier. Whether man actively avoids dissonance depends upon the situation. Brehm and Cohen (1962) reported

that whether a person freely chooses to set himself into a possible dissonant situation is related to the magnitude of dissonance produced. As discussed earlier, one may assume that man is not reactive in all situations and that he does indeed voluntarily place himself in situations where he expects a certain amount of imbalance to occur. When coerced into these situations, the amount of dissonance produced appears to be decreased as opposed to dissonant situations occasioned by voluntary action. According to Lecky (1951), if man has no choice in the matter, forced situations would not necessarily create a threat to self-image. Only the individual can make this judgement. Brehm and Cohen (1962) cited several studies to demonstrate this non-obvious factor in the arousal of dissonance.

Whether volition could affect this study was a matter of interpretation. Although the subjects volunteered into the Air Force, it is probable that because of conscription policies, many were volunteers under duress. Further, the subjects did not specifically volunteer for experimentation. The experiments were merely arranged as part of the training schedule. Conversely, one may assume that since the subjects were volunteers in the sense that they enlisted into the Air Force with full knowledge that training would be a result of that action. They were non-volunteers in the sense that they did not specifically volunteer to attend the lesson on "How To Study," nor did they volunteer to be subjects in an experiment.

Certainly there was reason to believe that volition and commitment were salient factors in this study. However, it is only the

personality of an individual that can determine just what is a dissonant producing condition. Theoretically it is feasible to believe that incongruent instructors could create dissonance in certain individuals. An investigation could have been designed to ferret out these individuals. But, to be practical, this investigation was designed to measure group results. If enough individual subjects became dissonant the group results would be affected. And for whatever the reasons, all individual subjects in the experimental groups of this investigation had a common identification in that they volunteered into the Air Force. Further, all subjects had recently completed the first six weeks of basic training where they learned to expect instructors of a status similar to Air Force Technical Sergeant rank. Theoretically, if group expectations and identification was great enough, incongruous instructors would produce dissonance.

First, a review of the following chapter will demonstrate that certain conditions of the experimental design controlled and limited the means for dissonance reduction to perceptual distortion. The testing situation limited the ways a person would most likely distort perception to three indicates. Distortion would most likely center on television as a medium of instruction, the instructor as a teacher and the subject material of the televised lesson. Second, the following chapter will illustrate that matching, stratification and randomizing procedures were utilized to average out individual differences and random variables likely to affect this study.

Finally the principle theoretical issue in terms of experimental results was whether the assumed group norm was ego-involved enough to

create dissonance in what may be considered a non-voluntary testing situation. Whether the dissonance as suggested by the perceptual distortion indicates would be sufficient to create learning differences was the critical concern of the investigation.

Chapter 3

PROCEDURE

Restatement of the Problem

The purpose of this study was to determine whether cognitive learning scores and perceptual distortion indicates of United States Air Force basic airmen would be affected by utilizing educational television instructors of different Air Force rank.

Experimental Model

The method of procedure was developed around a model illustrated in Table 1. A modified treatment by block design (Meyers, 1966) was created to analyze the criterion variable within treatment groups for each stratum. Each cell consisted of thirty matched and stratified subjects. Next, nine 3 X 4 Chi Square contingency tables (Ferguson, 1959:200-204) were devised for the analytical variables. The series included tables for each of the three perceptual distortion indicates based on a five point Likert type scale (Kerlinger, 1964) within treatment variables. The sequence was repeated for the high, medium and low stratum. After statistical analysis, inspection would reveal that the same cells were different in learning and in one or a combination of the perceptual distortion indicates. Differences in analytical variables within treatment groups would suggest the presence of dissonance. Differences in the criterion variable within treatment groups would indicate differences in learning.

Table 1

Experimental Model

Strata	Learning Treatment Variables Lt/Col.	T/Sgt.	Civ.	Amn.
High	1.1*	2.1	3.1	4.1
Medium	1.2	2.2	3.2	4.2
Low	1.3	2.3	3.3	4.3

*cell number N = 360

Example of modified treatment by Block Design using one-way analyses of variance

Perceptual Distortion: High Stratum

Indicate 1 (Test Item A) Television as a Medium of Instruction

Perceptual Distortion Indicate	Cells Lt/Col. 1.1	T/Sgt. 2.1	Civ. 3.1	Amn. 4.1
Unfavorable (d and e)	0	0	0	0
Neutral (c)	0	0	0	0
Favorable (a and b)	0	0	0	0

N = 120

Example of Chi Square contingency table for Analytical Variables

Population Study

Description. An assumption was made that an aptitude score, or some combination of the four available aptitude scores, could be added to the basic intelligence score ranges to increase the probability that stratification was efficient. The objective of the population study was to find some combination of aptitude and intelligence scores to permit stratification so the experiments could be conducted within two months.

A computer listing of the March 1970 personnel gains at Lowry Air Force Base (hereafter referred to as Lowry) included the matching and stratification information necessary to conduct the population study. These gains were assumed to be representative of future input due to the large number of course offerings and training times at Lowry. The matching criteria were: (a) First term male airmen who recently completed the first portion of basic training and were transferred to Lowry to attend a technical training school, (b) Ages seventeen through twenty-three at the time of selection, (c) High school graduates or above, and (d) Percentile rank available to the author on the Armed Forces Qualification Test (intelligence) and the Airman Qualifying Examination (four aptitude clusters). This matching criteria proved adequate for the experiments that followed.

The tests in (d) above are standardized tests used throughout the Air Force. According to Valentine (1968) the Armed Forces Qualification test has a reliability index of .88. The Airman Qualifying Examination provided four aptitude clusters; i.e., Administrative, Electrical, General and Mechanical. According to Vitola and Madden (1967) the

reliability index for these tests is .88. Test results were available only as percentile ranks. Hereafter in this study test names and percentile ranks will be referred to as intelligence scores and aptitude scores respectively.

Discussion. Four hundred and forty-five airmen who entered training at Lowry during March 1970 met the matching criteria. Inspection of Table 2 shows that the population intelligence scores were negatively skewed. Further inspection revealed that the aptitude scores were negatively skewed and there appeared to be little relationship between intelligence and aptitude scores for subjects falling in the ten through thirty range in intelligence scores.

Reason for the skewness and relationships between intelligence and aptitude scores may be found in the selection process for the Lowry training schools. Airmen are selected for entry into the Air Force on the basis of intelligence scores. However, the technical training centers determine the aptitude ranges required for each school. Therefore, the relationship between intelligence and aptitude score ranges in some training schools could be low even though curves for the total Air Force population may approximate normal curves above certain cut-off scores.

Intelligence ranges between ten and thirty represent Project One Hundred Thousand airmen. This program was instituted by Presidential directive to require the military services to accept and train a group of people who had previously been excused from service because of unacceptable intelligence scores. Possibly because of recruiting policies, most aptitude scores for these people were considerably higher than the

Table 2

Intelligence Percentile by Category

Standard Categories	Percentile Range	No. of Subjects
Category I	92-100	49
Category II	65-91	233
Category III	31-64	123
Category IV	10-30	40
Category V	0-9	0
		N = 445
$\bar{X}$ = 7.98	Med. = 73.57	Mo. = 85.00

corresponding intelligence scores. The aptitude scores ranged as high as the 80th percentile, while the upper limit for intelligence scores was the 30th percentile.

It was assumed these differences were attributable to the small quotas for Project One Hundred Thousand in combination with policies that allowed recruiters to take only the best; i.e., those who scored low on intelligence but had the highest aptitude scores. There was the possibility that some recruiters who had already filled their regular quotas and had some unfilled slots in the Project One Hundred Thousand quota could influence potential enlistees to score low on intelligence so they could be inducted into the Air Force. If these assumptions were true, they could account for the high aptitude scores of subjects who had scored ten through thirty percentile range in intelligence.

As a result of the findings of the population study, aptitude scores were made a main effect in stratification on the basic intelligence scores. This combination was an attempt to eliminate intelligence score error and insure that the low stratum actually consisted of subjects who really scored low on intelligence. Subsequent experimentation confirmed the population study forecasts in terms of cut off scores but not time estimates. The forecast times included an estimated 32 percent experimental loss due to uncertain availability of subjects for testing and rumored decreased training loads. Although the number of incoming students decreased slightly over 92 percent of the qualified subjects were made available for testing. The four and one-half weeks spent in experimentation was less than the forecast of 1.9, 1.8 and 1.6 months to test the high, medium and low strata.

Subject Selection Criteria

Students were matched according to the aforementioned criteria under discussion of the population study. Then subjects were stratified on the basis of intelligence score ranges of 10 through 62, 62 through 83, and 83 through 100 respectively for the low, medium and high strata. Further, only those men with two or more of the four available aptitude percentile scores in the basic intelligence strata range qualified as experimental subjects. When intelligence scores were at the cut off points of 62 or 83, the number of aptitude scores in a stratification range became the final determiner. When there were two aptitude scores in each stratum, the potential subject was disqualified. Stratification procedures eliminated an estimated 30 percent of the matched students.

The Lesson

The topic of the televised lesson was "How To Study." This subject was chosen for several reasons. The investigation called for the subject material to be neutral in terms of the treatment variables. This subject, How To Study, did not appear to present inherent biases within treatment variables such as might occur in a topic that reviewed the theory associated with underwater depth sounding equipment or how to fire a mortar. The subject matter was acceptable to the Lowry Technical Training Center, and this was one of the topics their consultants suggested as being useful and a common requirement in all technical training schools. Finally, since only a post-test was to be administered, the subject material should be on a topic unfamiliar to the subjects as a formal discipline so as not to create biases through differences in

experiences disassociated from the basic stratification criteria of intelligence. The subject material on How To Study appeared to be an acceptable alternative.

Appendix A provides detailed data on the televised lesson script. The first part of the lesson was taken from the Ebbinghaus curve of retention as described by Kelly (1965:230-231) and distributive reinforcement from an Air Force publication Studying To Learn (1955:28). The second part of the lesson, principles of learning, were modified and paraphrased from Kelly's (1965:214-217) review of the Thorndike laws of learning. The third part of the lesson, the 3 R system of learning through reading, was taken from Studying To Learn (1955:1-9). Illustrations and examples of application were created by the author to comply with the lesson goals. Bloom (1956:62-143, 201-205) and Mager (1962: 1-60) were the references used as a guide in developing the lesson goals and desired learning objectives.

Television Production

The television lessons were produced on two-inch black and white video tape at the United States Air Force Academy between July 8 and July 30, 1970. The director, instructor and crew members were aware that if conflicts developed between control and good production techniques, control was the critical factor. The author was present in the capacity of producer during all stages of production. The same lighting, set, cameras, camera angles, lens openings, sound levels, script, graphics and primary crew were used for each lesson. Portions of the script not requiring the appearance of the instructor on camera were

dited into each lesson from a master tape. The length of the programs varied from 21 minutes 30 seconds to 21 minutes 58 seconds.

The sequence of production by status of the instructor was randomized from tables in Arkin and Colton (1966:158-161). Complete details of the television production are included in Appendix A.

Test Instrument

The final test was divided into two sections. The first part contained the perceptual distortion indicates in the form of three opinion questions to be answered on a five point Likert type scale. The opinion questions are provided in Appendix B. The second part contained cognitive test items on the subject material of the televised lesson. The description below concerns only the cognitive test.

The original fifty-eight item test was administered to 170 airmen on July 17 and 20, 1970 after they had viewed the televised lesson with the instructor dressed in the Air Force technical sergeant uniform.

Subjects were tested, post matched and stratified on the basis of the same conditions described in the text of the dissertation for experimentation. One hundred and nine subjects met the subject selection criteria. There were forty, thirty-six, and thirty-three subjects respectively in the high, medium and low strata. Each stratum was reduced to thirty by random discard (Arkin and Colton, 1966). The subjects were used only for test development and did not later become part of an experimental group.

The item analysis was completed using the ITEMANA program on the Burroughs 5500 computer at the United States Air Force Academy. The

analysis included a realiability coefficient using the Kuder-Richardson formula number 20 (Thorndike and Hagen, 1961). This is similar to the split-halves method for inter-item consistency in that the reliability is found from a single administration of a single test. According to Anastasi (1968):

> It can be shown mathematically that the Kuder-Richardson reliability coefficient is actually the mean of all split-half coefficients resulting from different splittings of a test. The ordinary split-half coefficient, on the other hand, is based on a planned split designed to yield equivalent sets of items. Hence, unless the test items are highly homogeneous, the Kuder-Richardson coefficient will be lower than the split-half reliability [85].

The final test contained forty-two items. The lesson goals were not modified. The reliability estimate for ninety subjects was .859. Reliability estimates for the high, medium and low strata were .787, .739 and .778 respectively. More complete details are provided in Appendix C.

Testing Procedures

Background information. New students and their personnel records arrived at Lowry every Sunday, Tuesday and Thursday evening. Students were housed together and conducted through in-processing and other details for approximately three days. Then they were moved to more permanent quarters appropriate to the particular technical school they were scheduled to attend. Testing was conducted on the mornings after they arrived. The time of testing was from 10:45 until 12:00 noon every Monday, Wednesday and Friday.

The nature of the experiments was known only to senior officials of the organization to which the incoming students were assigned. New

students were not housed with subjects who had previously viewed one of the television programs and taken the test. These factors coupled with a busy schedule made it unlikely that there was any contamination created by communication between potential subjects and students who had already been exposed to an experiment. The nature of subject questions during testing and several follow-up discussions with appropriate officials convinced the author that the subjects had no prior knowledge of the nature of the experiments.

The sequence of the treatment variable television programs was randomized (Arkin and Colton, 1966) for each of the three testing days of the week. The randomized projection for each test day was extended on the calendar for two months to insure enough time to test an adequate number of subjects.

Procedures for subject selection. A testing day began with an analysis of the personnel records of students who arrived at Lowry on the previous evening. Intelligence scores and pertinent data from the records of students who met the subject selection criteria were recorded on special test forms supplied by the Air Force Academy. Codes were added to indicate the treatment variable and high, low or medium stratum. A list of names of the qualified subjects was delivered to an official who scheduled the students for experimentation later that same morning.

Procedures for testing. All experiments occurred in building 903, room 110 at Lowry. This was a 23 by 52 foot rectangular room with four matched 21 inch television sets (Conrac model CFB-21) spaced for

comfortable viewing by as many as 100 subjects. To render as little difference as possible between the quality of presentation from experiment to experiment an engineer tuned the audio and visual output of the program scheduled for that day. Then the tape would be cued and made ready for a showing before the subjects arrived for testing.

To comply with the assumed group norm, the author monitored all experiments in the uniform of an Air Force technical sergeant. Prior to each showing of the program, subjects were informed that neither the nature of the program nor its purpose could be divulged until after the lesson. Subjects were merely told that the program would be self-explanatory, that it lasted twenty-one minutes and the content should be remembered.

When the program was completed, coded test forms were distributed. The monitor explained that all technical schools had a common requirement for a block of instruction on how to study. The program the students had recently viewed satisfied that requirement. The program was also part of a series of lessons the Department of Defense audio visual services had prepared as a pilot program to (1) determine audience reaction, and (2) to develop a valid and reliable test for the instructional material. If the results of the pilot series was favorable the subject material would be developed into a standard instructional television program for common use throughout the Air Force.

Then the monitor explained the directions for taking the test and indicated there was no time limit. Students left the room individually as they finished the test.

Procedures for compiling data. After experimentation the perceptual distortion indicates from the three opinion questions were scored and placed on the test form. A running total of the number of subjects tested by treatment variable, stratum and sequence number was maintained until all strata of a treatment variable were filled. This signified the end of experimentation for the treatment variable. Each cell was then reduced to thirty by random discard (Arkin and Colton, 1966). An optical scanning machine at the Air Force Academy transferred the data from test forms to computer cards. From the cards, a computer listing was made to provide the perceptual distortion indicate data from which the Chi Square contingency tables were calculated. The cards were used again to provide input to analyses of variance computer programs to test the criterion variable in terms of treatment variables by strata.

Testing procedures summary. Experiments began August 5, 1970 and ended August 7, 1970. The beginning and ending times of the experiments did not vary by more than fifteen minutes. A total of 419 subjects were tested from a population of 443 qualified subjects. This represented approximately 94 percent of the incoming students who qualified as subjects during the time in which experiments were conducted. Twenty-four qualified subjects did not arrive for the scheduled tests. These losses were unavoidable and were in no way caused by the independent or treatment variables.

Chapter 4

RESULTS

Treatment Group Equivalency

In order to be sure of the effect of matching and stratifying procedures, the treatment groups were first tested to ascertain if they were essentially equal. If the treatment groups were essentially equal, analysis of variance rather than analysis of covariance would be used to test the criterion variable. This first analysis merely determined whether there was statistical support for the conjecture that the treatment groups were homogenous in terms of intelligence scores. The intelligence scores that were used to stratify the subjects provided the dependent variable to test for homogeneity.

The null hypothesis was: There is no difference in intelligence scores by treatment groups within the instructor treatment variables. Analyses of variance using intelligence scores as the dependent variables are provided in Tables 3 through 6. The null hypothesis was accepted in that no significant differences were found in intelligence scores within treatment groups from one-way analyses of variance (Burroughs Corporation, 1969). As a result of these findings, analysis of variance was used for all experimental hypotheses concerned with cognitive learning.

Table 3

Analysis of Variance to Test Equivalency of Treatment Groups: High Stratum

Treatment Group Cell	Number	I.Q. Mean	I.Q. S.D.	I.Q. Variation
Lieutenant Colonel	30	87.63	15.97	255.00
Technical Sergeant	30	91.00	4.21	17.72
Civilian	30	91.60	3.32	11.01
Airman	30	91.50	4.39	19.22

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	319.80	3	106.60	1.41 NS
Within Groups	8785.67	116	75.74	
Totals	9105.47	119		

The independent variable is the treatment group.

The dependent variable is the intelligence score.

Critical Value of $_{.05}F_{df\ 3,116} = 8.55$

Table 4

Analysis of Variance to Test Equivalency of Treatment Groups: Medium Stratum

Treatment Group Cell	Number	I.Q.		
		Mean	S.D.	Variation
Lieutenant Colonel	30	73.13	6.39	40.88
Technical Sergeant	30	74.33	6.80	46.30
Civilian	30	74.80	5.92	34.99
Airman	30	73.43	7.37	54.32

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	54.03	3	18.01	.41 NS
Within Groups	5118.30	116	44.12	
Totals	5172.33	119		

The independent variable is the treatment group.

The dependent variable is the intelligence score.

Critical Value of $_{.05}F_{df\ 3,116} = 8.55$.

Table 5

Analysis of Variance to Test Equivalency of Treatment Groups: Low Stratum

Treatment Group Cell	Number	I.Q.		
		Mean	S.D.	Variation
Lieutenant Colonel	30	30.27	17.08	291.65
Technical Sergeant	30	36.20	15.45	238.65
Civilian	30	33.10	15.05	226.58
Airman	30	32.90	15.44	238.44

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	530.30	3	176.77	.71 NS
Within Groups	28864.07	116	248.83	
Totals	29394.37	119		

The independent variable is the treatment group.

The dependent variable is the intelligence score.

Critical Value of $_{.05}F_{df\ 3,116} = 8.55$.

Table 6

Analysis of Variance to Test Equivalency of Treatment Groups: Combined Strata

Treatment Group	Number	I.Q.		
		Mean	S.D.	Variation
Lieutenant Colonel	90	63.68	28.13	791.30
Technical Sergeant	90	67.18	25.11	630.64
Civilian	90	66.50	26.47	700.45
Airman	90	65.94	26.62	708.77

Sources of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	621.94	3	207.31	.29
Within Groups	251972.03	356	707.79	
Totals	252593.97	359		

The independent variable is the treatment group.

The dependent variable is the intelligence score.

Critical Value of $_{.05}F_{df\ 3,356} = 8.54$.

Review

Before proceeding to the experimental hypotheses and analyses, a review is provided to remind the reader of the purposes of these analyses and to serve as a reference point for the numerous tables that follow.

The review consists of a restatement of the problem and a restatement of the research proposition and its explanation. It ends with two tables that should be useful to refer to as the reader proceeds through the numerous analyses constructed for each null hypothesis. The first table shows how the population was divided into various treatment groups, strata and cells. It should aid in understanding the second table that deals with the experimental model. The titles of the tables are "Divisions of the Experimental Population" and "Representation of the Experimental Model." They may be located by referring to Table 7 and Table 8.

Restatement of the problem. The purpose of this study was to determine whether cognitive learning scores and perceptual distortion indicates of United States Air Force basic airmen would be affected by utilizing educational television instructors of different Air Force rank.

Restatement of the proposition. The Technical Sergeant instructor will be more congruent with student expectations than the Airman, Lieutenant Colonel or Civil Service instructors. Student expectations will manifest a group norm in terms of higher learning scores and lower perceptual distortion rates around the Technical Sergeant treatment variable.

Table 7

Divisions of Experimental Population

	Treatment Variable				
	Lieutenant Colonel	Technical Sergeant	Civilian	Airman	
High Stratum	n = 30	n = 30	n = 30	n - 30	n = 120
Medium Stratum	n = 30	n = 30	n = 30	n = 30	n = 120
Low Stratum	n = 30	n = 30	n = 30	n = 30	n = 120
	n = 90	n = 90	n = 90	n = 90	N = 360

Table 8

Representation of Experimental Model

Example of a modified treatment by block design using one-way analyses of variance by stratum for the criterion variable.

Strata	Treatment Variables			
	Lieutenant Colonel	Technical Sergeant	Civilian	Airman
High Stratum	1.1*	2.1	3.1	4.1
Medium Stratum	1.2	2.2	3.2	4.2
Low Stratum	1.3	2.3	3.3	4.3

*Cell number Cell n = 30 Treatment Group n = 90 Total N = 360

Example of modified treatment by block design using a Chi Square contingency table for the high stratum analytical variable (Opinion question A, Television as a medium of instruction).

Perceptual Distortion Indicate	High Stratum by Treatment Variable			
	1.1 Lieutenant Colonel	2.1 Technical Sergeant	3.1 Civilian	4.1 Airman
unfavorable (d and e)	$f_{1.1,de}$	$f_{2.1,de}$	$f_{3.1,de}$	$f_{4.1,de}$
neutral (c)	$f_{1.1,c}$	$f_{2.1,c}$	$f_{3.1,c}$	$f_{4.1,c}$
favorable (a and b)	$f_{1.1,ab}$	$f_{2.1,ab}$	$f_{3.1,ab}$	$f_{4.1,ab}$
	Cell n=30	Cell n=30	Cell n=30	Cell n=30

f = frequency of occurrence for answer a, b, c, d, or e Stratum n = 120

To read the table:

(1) The first half of the model represents the cognitive element of the concept or differences in the learning test. Three one-way analyses of variance tested the criterion variable by stratum within treatment variables. Then the strata were collapsed and a one-way analysis of variance tested the criterion variable within treatment variables by combined strata or total treatment group.

(2) The second half of the model is only one example of the affective element of the concept or perceptual distortion. Altogether nine Chi Square contingency tables were required to test the analytical variables by treatment variables.

(3) The two part model made it possible to use a simple inspection procedure to see if the same cells were different in both criterion variable (cognitive element) and in one or a combination of the analytical variables (affective element).

Explanation of the proposition. Learning would be measured by the criterion variable or group scores on the post-test. Perceptual distortion would be measured by analytical variables or group scores on the opinion questions. The cognitive element was represented by the criterion variable. The affective element was represented by the analytical variables. The group expectation or norm will prove to be both relevant and strong enough to create cognitive dissonance when subjects are forced into a situation where they must view an instructor who is cognitively inconsistent with their expectations. Since subjects cannot avoid the physical situation, congruence must be attained by perceptual distortion or selection. Some of the psychic energy will be directed toward attaining cognitive balance rather than learning. This energy will be reflected in relatively higher perceptual distortion indicates referred to as analytical variables in this study. Other factors being equal, there should be a positive statistical relationship between the more negative perceptual distortion indicates and a decrease in learning. Differences in perceptual distortion would indicate whether dissonance was experienced by subjects within treatment variables. An assumed student expectation or group norm was necessary for prediction purposes. However, differences in analytical variables within treatment variables would suggest whether there were differences in identification associated with a particular rank and the assumed group norm could be altered accordingly.

Experimental Hypotheses

Learning. The first null hypothesis was concerned with the first

half of the experimental model. The null hypothesis was: There is no difference in cognitive learning scores within instructor treatment variables by ability level stratum and by the total of all strata. The null hypothesis was accepted in that one-way analyses of variance (Burroughs Corporation, 1969) showed no significant differences in the test instrument scores (dependent variable) within instructor treatment (independent variable) groups. These analyses are shown in Tables 9 through 12.

Perceptual distortion. The second null hypothesis was concerned with the second half of the experimental model. A series of Chi Square tables were used to test the group results of each of the three opinion questions by each stratum within treatment variables. A single table shows the results of each of the three questions in a stratum.

The null hypothesis was: There is no difference in perceptual distortion indicate frequencies within instructor treatment groups by ability level stratum. The null hypothesis was accepted in that a series of Chi Square contingency tables showed no significant differences in perceptual distortion indicate frequencies (dependent variable) within instructor treatment (independent variables) groups. This series of analyses are shown in Tables 13 through 15.

Test Development Group and Experimental Group Differences

Test development and related procedures were discussed in Chapter 3. It was noted that the subject selection procedures used for test development were slightly different than those used in the experiments that followed. The difference was that the test development subjects were post-selected. This means the subjects were selected out of a group of

Table 9

Analysis of Variance to Test Learning Differences:
High Stratum

Treatment Group	Number	Post-Test		
		Mean	S.D.	Variation
Lieutenant Colonel	30	28.33	6.27	39.26
Technical Sergeant	30	30.20	5.46	29.82
Civilian	30	28.80	5.79	33.55
Airman	30	29.47	6.29	39.50

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	59.47	3	19.82	.56 NS
Within Groups	4121.73	116	35.53	
Totals	4181.20	119		

The independent variable is the treatment group.

The dependent variable is the post-test score.

Critical Value of $_{.05}F_{df\ 3,116} = 8.55$.

Table 10

Analysis of Variance to Test Learning Differences:
Medium Stratum

Treatment Group	Number	Post-Test		
		Mean	S.D.	Variation
Lieutenant Colonel	30	24.87	5.70	32.53
Technical Sergeant	30	25.17	6.59	43.39
Civilian	30	25.37	4.92	24.24
Airman	30	26.43	5.14	26.39

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	41.82	3	13.94	.44 NS
Within Groups	3669.97	116	31.64	
Totals	3711.79	119		

The independent variable is the treatment group.

The dependent variable is the post-test score.

Critical Value of $_{.05}F_{df\ 3,116} = 8.55$

Table 11

Analysis of Variance to Test Learning Differences:
Low Stratum

Treatment Group	Number	Post-Test		
		Mean	S.D.	Variation
Lieutenant Colonel	30	17.77	5.99	35.84
Technical Sergeant	30	18.20	4.75	22.51
Civilian	30	18.17	5.13	26.28
Airman	30	20.53	7.00	49.02

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	142.87	3	47.62	1.43 NS
Within Groups	3875.80	116	33.41	
Totals	4018.67	119		

The independent variable is the treatment group.

The dependent variable is the post-test score.

Critical Value of $_{.05}F_{df\ 3,116} = 8.55$

Table 12

Analysis of Variance to Test Learning Differences:
Combined Strata

Treatment Group	Number	Post-Test		
		Mean	S.D.	Variation
Lieutenant Colonel	90	23.66	7.39	54.65
Technical Sergeant	90	24.52	7.46	55.67
Civilian	90	24.11	6.87	47.25
Airman	90	25.48	7.16	51.35

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio
Between Groups	162.65	3	54.22	1.04 NS
Within Groups	18592.12	356	52.23	
Totals	18754.78	359		

The independent variable is the treatment group.

The dependent variable is the post-test score.

Critical Value of $F_{df\ 3,356}$ at .05 = 8.54

Table 13

Chi Square Frequencies to Test Perceptual Distortion: High Stratum

Perceptual Distortion Indicate	Cells: Lieutenant Colonel 1.1	Technical Sergeant 2.1	Civilian 3.1	Airman 4.1	
Indicate 1 (Opinion Item A): Television as a Medium of Instruction					
unfavorable (d and e)	9	10	11	9	39
neutral (c)	8	8	10	7	33
favorable (a and b)	13	12	9	14	48
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59	χ^2 = 2.03 NS				
Indicate 2 (Opinion Item B): The Instructor as a Teacher					
unfavorable (d and e)	1	5	4	3	13
neutral (c)	13	15	18	14	60
favorable (a and b)	16	10	8	13	47
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59	χ^2 = 6.75 NS				
Indicate 3 (Opinion Item C): Subject Matter					
unfavorable (d and e)	2	3	6	5	16
neutral (c)	8	9	8	7	32
favorable (a and b)	20	18	16	18	72
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59	χ^2 = 3.19 NS				

Table 14

Chi Square Frequencies to Test Perceptual Distortion: Medium Stratum

Perceptual Distortion Indicate	Cells				
	Lieutenant Colonel 1.2	Technical Sergeant 2.2	Civilian 3.2	Airman 4.2	
Indicate 1 (Opinion Item A): Television as a Medium of Instruction					
unfavorable (d and e)	7	8	9	7	31
neutral (c)	8	10	9	11	38
favorable (a and b)	15	12	12	12	51
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59			χ^2 = 1.41 NS		
Indicate 2 (Opinion Item B): The Instructor as a Teacher					
unfavorable (d and e)	1	4	5	2	12
neutral (c)	10	14	9	12	45
favorable (a and b)	19	12	16	16	63
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59			χ^2 = 6.22 NS		
Indicate 3 (Opinion Item C): Subject Matter					
unfavorable (d and e)	2	6	2	3	13
neutral (c)	6	10	9	6	31
favorable (a and b)	22	14	19	21	76
	30	30	30	30	120
Critical value $_{.05}\chi^2$ 6 = 12.59			χ^2 = 6.95 NS		

Table 15

Chi Square Frequencies to Test Perceptual Distortion: Low Stratum

Perceptual Distortion Indicate	Cells				
	Lieutenant Colonel 1.3	Technical Sergeant 2.3	Civilian 3.3	Airman 4.3	
Indicate 1 (Opinion Item A): Television as a Medium of Instruction					
unfavorable (d and e)	7	8	6	5	26
neutral (c)	8	10	11	6	35
favorable (a and b)	15	12	13	19	59
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59		χ^2 = 4.41 NS			
Indicate 2 (Opinion Item B): The Instructor as a Teacher					
unfavorable (d and e)	1	3	5	3	12
neutral (c)	12	15	5	15	45
favorable (a and b)	17	14	20	12	63
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59		χ^2 = 10.05 NS			
Indicate 3 (Opinion Item C): Subject Matter					
unfavorable (d and e)	1	3	1	3	8
neutral (c)	8	4	8	2	22
favorable (a and b)	21	23	21	25	90
	30	30	30	30	120
Critical value $_{.05}\chi^2$ df 6 = 12.59		χ^2 = 7.40 NS			

new students after the group of new students had been tested en masse. Although the same subject selection criteria was used, experimental subjects were all pre-selected before experimentation. Therefore, experimental groups consisted only of subjects who had already met the subject selection criteria.

Since the Air Force Technical Sergeant instructor treatment variable program was used for test development purposes, it was necessary to inspect the results of the experimental group that had been exposed to the same television program to see if the test means of these two groups remained approximately equal. Inspection revealed that the means of the two treatment groups were different. These differences are illustrated in Table 16.

It was decided to proceed without additional verification of the learning test because the results of this study (Tables 9 through 12) indicated that the differences between the test development treatment group mean and each of the experimental treatment group means were approximately equal. Since tables 9 through 12 illustrate that there was no significant differences within the means of the experimental treatment groups, there is reason to believe the learning test was reliable and hence the experimental results were not affected by the difference in means between the test development group and the experimental group that viewed the television program using the Air Force Technical Sergeant variable.

Had the first part of this chapter revealed differences in learning within the treatment groups, the test would have required further verification because it would not be known whether the differences

Table 16

Comparison of Cognitive Test Score Means of Experimental Treatment Group and Test Development Treatment Group Exposed to the Air Force Technical Sergeant Treatment Variable

	Air Force Technical Sergeant Treatment Variable		
	Experimental	Test Development	n
High Ability Cells	30.20	28.33	30
Medium Ability Cells	25.17	21.53	30
Low Ability Cells	18.20	11.27	30
Treatment Group (Combined Cells)	24.52	22.29	90

were attributable to the instructor status or an unreliable test. However, since no differences appeared within experimental treatment groups for the test, there was reason to believe the test was reliable in that the same results occurred within the various experimental treatment groups.

The most apparent reasons to be conjectured for the difference in test scores for the Air Force Technical Sergeant uniform treatment variable for the test development group and the experimental group are (1) the post-selection procedures resulted in a larger number of people being tested at one time, some of which were not subsequently used as test development subjects, and (2) the number of test questions was larger in that test development subjects answered fifty-eight items while experimental subjects answered forty-two.

Even if these factors did create the differences apparent in the treatment group test means, the differences were the same between the test development treatment group and each of the experimental treatment groups. As such, the difference probably did not affect the results of this study.

Chapter 5

CONCLUSIONS

Introduction

Although the statistical results of this study were negative and the nature and conditions of an experimental investigation limit the parameters in which one can render valid generalizations, the implications of this study indicate that it contributed to both the practical and theoretical considerations that were used to justify the study.

In practical terms, this study provides evidence that instructor military rank does not create differences in learning within the television medium of instruction. In theoretical terms, the results of this study suggest that a different approach toward comparative studies in instructional television may be in order. Further, until invalidated, the theoretical model of this study remains a potential approach to some contemporary issues. With improvement, modification, and replication, the model could be used for investigations about the possible affect of teacher race and status on student learning and perception within various instructional media.

Limitations

The conclusions of the study should be applied only in terms of the experimental conditions under which the study was undertaken.

These conditions were:

1. The television medium was the vehicle for instruction.

2. The treatment variables were Air Force Airman, Technical Sergeant, Lieutenant Colonel and a business suit typical of a United States Civil Service employee.

3. The matching criteria were: (a) First term male airmen who recently completed the first portion of basic training and were transferred to Lowry to attend a technical training school, (b) Ages seventeen through twenty-three at the time of selection, and (c) High school graduates or above.

4. Subjects were stratified on the basis of intelligence score ranges of ten through sixty-two, sixty-two through eighty-three, and eighty-three through one hundred respectively for the low, medium and high strata. Further, only airmen with two or more of the four available aptitude percentile scores in the basic intelligence strata range, qualified as experimental subjects.

5. The subject material "How To Study" was neutral in that it contained no inherent biases within treatment variables.

6. The subjects did not directly volunteer for experimentation.

Conclusions

The following conclusions were made on the basis of the statistical results of the study:

1. Given the conditions of the study, Air Force rank (treatment variables) made no differences in learning achievement.

2. Given the conditions of the study, Air Force rank (treatment variables) made no differences in perceptual distortion.

Implications of Conclusions

Practical. In the justification of the study it was suggested that the results of this investigation could render data to support or dispute whether the strength of identification possibly associated with the military rank of an instructor could affect cognitive learning. Within the conditions of the study, the results indicate that the military rank of an instructor did not make statistically significant differences in learning or perceptual distortion. The problem here is that the results of this one isolated study should not be generalized to other situations different than what would be implied under the conditions of the study.

Sampling theory would suggest that the results of this study should not be generalized to the Air Force population. Subjects were drawn from a very limited segment of the Air Force population that was located at Lowry. There was a reason why these subjects were assigned to Lowry rather than to some other technical training center. Those reasons, whatever they may be, would render the Lowry population of new students possibly different from students that were assigned to other locations. The Lowry new student population can not be considered as representative of the new student population of the Air Force as a whole.

Even for the Lowry new student population, the results of this study should not be generalized beyond conditions similar to those of this study. A biased lesson topic that was on a subject peculiar to some

other branch of service would have increased the possibility of dissonance arousal in this study. Thus any attempt to generalize the results of this study beyond the condition that the subject material be on "How To Study" or a neutral subject is tenuous. Similar examples could be created for each condition of the study.

Conversely, these limited conditions do not mean that the investigation is without value. It is possible to render limited generalizations on the basis of statistical trends. If several similar studies and replications indicated that the military rank of instructors made no difference in student learning and perception, a statistical trend would be established to lend support to broader generalizations that the results of this isolated study could not attest to.

Instructional television. In the justification of this study it was suggested that although television was necessary because of the practical and control questions, the investigation was almost unique in that it was directed toward finding more efficient means for learning within the medium of television by itself.

It was difficult to express the concept of what the implications of this study might be to instructional television without suggesting additional comparative studies between media of instruction such as the live medium versus the television medium versus the film medium for some controlled variable. Although the literature on instructional television is inconclusive, it does suggest that the time for comparative studies is past. The comparative studies have indicated that television can be an efficient medium for instruction. But this conclusion

is generally qualified by suggestions that the medium be used in a well coordinated overall effort in combination with other aids including a live instructor. In other words, it would seem that television should be used similar to a training aid. The principles remain the same. Use television only when it can enhance an instructional situation. Don't try to make it replace the classroom teacher in all situations. Therefore the question arises as to just what kind of comparative studies were being discussed and would the elimination of all comparative studies detract from the goal of making television instruction more efficient.

The implications of this investigation suggestion that comparative studies would be necessary in order to render television instruction more efficient. For example, perhaps studies similar to this investigation in other media such as the live medium or film medium would find that the medium itself may effect or tend to negate the conditions necessary for the arousal of dissonance. Television may have a tendency to wash out the personal contact associated with some ego-involved issues. Without ego-involvement there could be no dissonance.

The medium of black and white twenty-one inch television is quite different from wide screen color film. Both are different from a live presentation in which the instructor appears in person. Most comparative studies appear to have been designed to prove which medium was the best instructional vehicle in a particular situation without delving into whether the medium itself could create differences in perception and hence learning. Perhaps some of these situations were

inadvertently conditioned in such a manner as to arouse dissonance in one medium and not the other. If this were true it could help to explain why the results of comparative studies have tended to be inconsistent.

For these reasons, the theoretical model of this study could possibly be useful if the trend of media investigations shifts toward finding what creates differences in dissonance arousal for one medium that are not apparent in another. The comparisons of learning could wait until situations had been uncovered in which dissonance arousal was proved significantly different between two mediums of instruction. Some implications of this concept will be discussed in the following section.

Theoretical implications. In the justification of the study this investigation was defended in terms of an approach to investigating some questions about learning theory and perceptual discrimination. There were several critical theoretical issues. The issues were ego-involvement, the relationship of ego-involvement and time to the television medium, and volition

The criterion for whether an idea (cognition) and in this case a group norm has been assimilated is the behavior of a person. Once a cognition is assimilated it must be maintained unless displaced by a reorganization of ideas. Ambivalent behavior means that contradictory ideas are competing for acceptance. And only the person can reorganize these ideas into a unified whole. Inconsistent ideas would only affect behavior to a significant degree when self-image was involved. In this

study it was necessary to determine whether identification with a particular Air Force rank was ego-involved enough to create dissonance when instructors of different ranks were utilized for teaching basic airmen. The perceptual distortion indicate group scores were designed to suggest whether dissonance was present. And if the presence of dissonance was suggested, the learning rates were predicted to be lower because some of the psychic energy would be used in maintaining cognitive balance rather than for learning. If the design of this investigation provided adequate controls for undesired variables then a theoretical implication arising from the lack of differences found in this study would be that the assumed group norm (identification with the Air Force Technical Sergeant rank) was not ego-involved enough to create dissonance when subjects were exposed to incongruent instructors of other ranks.

The second theoretical issue was concerned with the length of exposure to the various instructor ranks. Both Lecky and Festinger indicated that dissonance could be temporary. The assimilation of ideas into the organizational process was viewed as dynamic, constantly changing and being modified as an individual matured. Therefore, the appropriate length of time to expose the various instructor ranks to subjects was not known. The time was eventually predicated on the amount of subject material believed necessary to develop a valid and reliable cognitive test instrument. But dissonance should occur instantly as soon as an unexpected instructor appeared. In a live medium it would be expected that dissonance would decrease relative to the length of exposure. As the students began to use mechanisms to reduce dissonance they would

begin to rationalize away the effect of the unexpected instructor ranks and in the end probably judge the instructor relative to his competence and common human characteristics.

The third consideration revolves around the medium of communication. The effect may be different in the television medium versus another medium of instruction. The subjects may have already learned to react to the television medium differently than a live medium. Since television is essentially a one-way medium the human and personal element may have been learned to be viewed as inconsequential. This may be reasonable in light of the fact that very few television viewers have ever been able to initiate a personal relationship with a television personality. And certainly they were unable to do so in reverse fashion, or in a manner of speaking, "through the tube." This possible difference created by how a person "uses" the medium may be illustrated by imagining the difference in ego-involvement between the active participants in a live riot versus the ego-involvement of those who view the same riot on television. Even if television coverage was biased by making a small mob appear out of proportion to the live event by concentrating on close shots of threats and violence; the amount of adrenalin released by live and television participants would likely be different. As such it would be expected that if all other conditions were equal, there would be a difference in the amount of ego-involvement between live medium and television medium participants.

If there is anything to these arguments it could be expected that the subjects had already learned that television was an impersonal medium

in which real contact with the communicator was impossible. It would also seem reasonable to expect that possibly dissonant stimuli emitted from the twenty-one inch tube would be viewed more impersonally. As a result it would be more difficult to raise an ego-involved issue through television as opposed to a live medium situation. A television personality would probably be judged more on what was said rather than on the way he was dressed, the color of his skin or country of origin. In a very personal live medium, ego-involved issues would be more likely to become issues and hence possibly create differences in perception and learning.

Another theoretical consideration is the possible effect of volition. The literature indicated that the arousal of dissonance was affected by volition, or whether a person freely chose to place himself into a possibly dissonant situation. Resistance and assimilation were natural processes and the individual learns that in order to continue to develop he must face dissonant situations. If a person has no choice in the matter the degree of ego-involvement and hence dissonance arousal would be as great.

In this study the subjects did not directly volunteer for experimentation. However they did volunteer into the Air Force with the realization that training was a product of that action. The practical justification of this study rendered the use of experimental volunteers unrealistic. Therefore nothing was built into the design to separate the differences created by volition versus ego-involvement. Volition was merely another factor possibly contributing to ego-involvement. And since the perceptual distortion indicates group scores were not different

in these treatment variables, it was to be expected that dissonance was not present. And if the design controlled for random variables, the reason for the lack of dissonance was probably that the group norm or identification with the Air Force Technical Sergeant rank (or for that matter any of the ranks) was not an ego-involved issue of sufficient strength to create dissonance over unexpected instructor status. The factor of volition may have contributed to this lack of ego-involvement.

Theoretical model. The theoretical model may be considered that part of the investigation which attempted to apply the theory of cognitive dissonance to the experimental model. The most precise statement of the theoretical model may be found in the proposition and the one paragraph explanation that follows it.

The results of this investigation have neither supported nor discredited the theoretical model. The concept that cognitive and affective elements could possibly be associated through the correct application of the theory of cognitive dissonance remains in limbo. Since no differences were found in the affective element, according to the model it would be expected there was no difference in the cognitive element. Had there been differences in one and not the other, support would be present to discredit the theoretical model. As it stands, the model has the potential of being modified, and replicated under conditions where perceptual distortion is present to see if there will be corresponding differences in learning.

Recommendations for Further Study

1. Similar studies should be completed within the service

branches of the Department of Defense using a variety of lesson topics, different age groups and different subject populations. The results of several investigations would possibly establish a statistical trend from which broader practical generalizations could be rendered.

2. Similar studies should be completed in several media of instruction to determine whether perceptual distortion under certain conditions is associated with a medium of instruction not apparent under the same conditions in another medium of instruction.

3. The theoretical model of this study could be used as the basis of research in a variety of contemporary issues in which a pilot study should determine, whenever possible, significant differences in perceptual distortion before experimentation began to determine whether there was a corresponding decrease in learning.

APPENDICES

For the purpose of clarity Appendix A is divided into six subsections. Appendix A-1, lesson goals, was constructed after reviewing the subject matter literature and before the lesson script was written. The lesson goals were considered general enough to allow for a flexible script while being narrow enough to provide an adequate guide in the development of the televised lesson. The desired learning objectives are more specific and were constructed after the script was reviewed and considered adequate. The desired learning objectives were matched with the lesson goals and used as a guide for test item construction. The desired learning objectives were considered as being appropriate to the test instrument and were therefore placed in Appendix C, test instrument. Appendix A-2 is a description of the symbols necessary to interpret the script. The television lesson script has been placed behind the symbols and labeled Appendix A-3. Appendix A-4 is included to illustrate the graphics. The graphics were created on 11 x 14 inch grey cards with black tempra for lettering and diagrams. The scaled facsimilies in Appendix A-4 were labeled G 1 through G 30. The context of the televised program can be maintained by cross referencing between Appendices A-3 and A-4. A set diagram and list of equipment were included to satisfy requirements for replication. These were included in Appendices A-5 and A-6. Finally, Appendix A-7 contains expert testimony that there were no significant differences between the television lessons except the uniform variables.

APPENDIX A-1

LESSON GOALS

1.0 The first goal of this lesson is that each student should demonstrate knowledge of the curve of forgetting.

2.0 The second goal of this lesson is that each student should demonstrate knowledge of distributive reinforcement.

3.0 The third goal of this lesson is that each student should demonstrate knowledge of the principles of learning.

4.0 The fourth goal of this lesson is that each student should demonstrate knowledge of the 3 - R system of learning through reading.

5.0 The fifth goal of this lesson is that each student should demonstrate knowledge of some relationships of the curve of forgetting, distributive reinforcement, principles of learning and the 3 - R system of learning through reading.

6.0 The sixth goal of this lesson is that each student should demonstrate comprehension of some relationships of the curve of forgetting, distributive reinforcement, principles of learning and the 3 - R system of learning through reading.

7.0 The seventh goal of this lesson is that each student should demonstrate application of the concept of distributive reinforcement, the principles of learning, and the 3 - R system of learning through reading.

APPENDIX A-2

SYMBOLS

Floor camera designated 1 or 2. This symbol always used with talent.

C	close shot.
M	medium shot.
L	long shot.
MC	medium close shot.
ML	medium long shot.

Full screen graphic from floor camera with graphic and camera as indicated.

Edited segment from master video tape.

Key with graphic and floor camera as indicated. This symbol always indented.

Narrative passage underlined to illustrate beginning and end of key above.

Edit point for a VT segment or to set up graphics.

APPENDIX A-3

SCRIPT

VISUAL	AUDIO
VT 1	"beep beep . . . beep beep." (Sound effects record SEL-12-B, Track 15, Armed Forces Radio and Television Services, 1016 North McCadden Pl., Los Angeles 38, California, 1964.)
1 After VT 1 begin LS at defocus. Focus and zoom in to MS. Begin in limbo light (back lights only), slowly bring in full. Full just before the talent begins. Lights remain full to end. Cue instructor._____	An airman basic of 25 had been abandoned on a desert island since the age of 17. One day while in search of food he stumbled across a beautifully sensuous female lying on the

VISUAL

AUDIO

beach nearly naked . . . she had been washed ashore from a shipwreck just that morning. After they got over the initial shock at seeing each other, the girl wanted to know how long he had been alone on this barren bit of land.

"Almost eight years," he said.

"Eight Years!" she exclaimed! "But how did you survive?!"

"Oh, I fish, dig for clams, and gather berries and coconuts," he replied.

"And what do you do for sex" she asked.

"What's that?" . . . he looked puzzled.

"Whereupon the bold maiden pulled the innocent airman down onto the sand beside her.

After awhile she asked if he had enjoyed it.

"Great!" was the reply. "But look what it did to my clam digger!"

MC

Yes, we are all born with certain tools . . . we all have abilities, intelligence and skills which while used . . . are not always used in the best fashion or proper manner. We somehow learn to do tasks a certain way . . . it becomes habit . . . and like the young airman, we roll along through life, boxed in by habit and never really looking for another use or possibly better way of using our talent.

VISUAL	AUDIO
	This program is about talents . . . talents that most people misuse because they've locked them up in a box of bad habits since childhood.
VT 2	
	Bugle call ending with "CHARGE."
	(Sound effects record SEL-13-B, Track 3, first 3 seconds, Armed Forces Radio and Television Services, 1016 North McCadden Pl., Los Angeles 38, California, 1964. "Charge" added from four live voices in sound booth. Total is five seconds.)
1 G 1	
	Background music at G 1 and continuing through G 3.
2 G 2	
	(Begin after 10 second introduction on Production Music Library No. 3, Side 2, Cut 4. Record produced by Capital Records, Customs Division, 1016 North McCadden Pl., Los Angeles 38, California, no date.)
1 G 3	
	Cut motor for run down record sound just after G 3 appears.
2	
	Now that is a let down . . . you thought it was going to be about the various uses of the clam digger.

VISUAL

AUDIO

But the story serves a very important point. If you are an average group, there is not one of a hundred of you that really know how to use your talent for study.

Why? . . . because a long time ago you either didn't develop good study habits or didn't develop any study habits at all. And if you are like most people you probably drifted along through your schooling without ever really worrying about efficiency in learning. You could get by without it. As a result you probably wasted a lot of what time you did put in study . . . and relative to that time you didn't learn much either. For that reason . . . the real title of this program should be "How to learn more without really trying" . . . or in other words, "How to learn more without spending anymore time at it."

To do this, let us start by looking at forgetting. You've been forgetting more than you've learned for most of your life.

1
G 4

(5 sec. pause to view graphic, then cue talent to talk over graphic)

You can call this a curve of retention or the rate of forgetting, whichever way you want to look at it. A contemporary of your great grandfather named Ebbinghaus developed this curve from the results of experiments with students. And since 1885 many similar studies have verified it.

VISUAL	AUDIO
2 G 5	(5 sec. pause to view graphic, then cue talent to talk over graphic.) After only one hour people forget more than they have learned. (Pause) And after one month you remember practically nothing.
1 MC	(Talent on camera again) Of course you know this. Or at least you feel it intuitively. So what do you do? You CRAM . . . or at least most people do.
2 G 6	(5 sec. pause to view graphic, then cue talent to talk over graphic.) If the test is the first thing in the morning, and there wasn't very much to learn, you can do pretty well on the test and then forget it. But, with only a 20 minute break before the test, you have already forgotten 42 % of the material you learned in that one hour cram session.

VISUAL	AUDIO
1 G 7	(5 sec. pause to view graphic, then cue talent to talk over graphic.) When there is a lot to learn and the test was given later in the day . . . you are in real trouble. You will have forgotten about 60 % of what you've learned.
2 C	(Talent on camera.) Ebbinghaus and others found out that there was an easier way to do it. A way that would give far better results without spending any extra time. How about breaking out of that box of tired habits?
1 G 8	(Slight pause, then cue talent to talk over graphic.) It's called distributive reinforcement. Researchers found that if a student uses a little gray matter to think about it . . . he divides the same amount of learning time into several study periods. Instead of cramming at the last minute, he begins studying the same day the material is first introduced while he can still remember most of it. With each review the downward slope of the curve flattens out a little bit . . . After each review the rate of forgetting is not so severe.

VISUAL

AUDIO

This means that the next review can be of shorter duration. In other words, it doesn't take as much time to find out what you've forgotten . . . and the night before the exam, 5 minutes in review is sufficient rather than a one hour cram session beginning from scratch.

And upon arriving fresh for the test . . . the overall retention rate is much higher than could be expected from a cram session.

----------(Edit for set up.)----------

MC _____

Distributive reinforcement produces striking results in these simple learning experiments. Of course the problem is that students are usually attempting to learn many subjects throughout various periods of the day. Thus the simple concept of distributive reinforcement becomes a complex problem when trying to apply it in every day situations. But distributive reinforcement can be applied to your individual advantage. The problem is that you have to want to learn badly enough to take the time necessary to organize your various courses and study habits on the basis of this concept.

Usually this means a review of any new material the same day it was introduced . . . and then scheduled review periods until the exam.

(Transition statement.)

Distributive reinforcement isn't the only thing necessary for efficient learning. The judicious application of the principles of learning will help.

VISUAL

AUDIO

(Pause for graphics announcing the Principles of Learning.)

2
G 9

(Timed by reading graphic aloud.)

(Edit for set up.)

2
G 10

(Timed by reading graphic aloud.)

(Edit for set up.)

1

Distributive reinforcement may be the greatest thing since a new use was found for the clam digger . . . but it is important to remember . . . before our young shipwrecked airman could discover . . . he had to want to discover.

Without this willingness or desire or curiosity . . . name it what you will, he would never have agreed to any new experiences from his lovely teacher.

2
G 11

But he was ready for a new experience . . and thus learned from it. This is called the principle of readiness. A student must be willing or motivated to learn."

VISUAL

AUDIO

Sound simple? Well of course it does! But think back and remember yourself or others you have known . . . and how they fought it. It is so easy to convince yourself that a learning experience is not relevant . . . how is this going to help me?

But when you really get to thinking about it you can never tell just what situation you may eventually be faced with. Who would have ever imagined that the airman would eventually be stranded on his desert island.

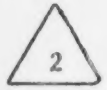
Yet . . . had he been trained during his high school years in survival techniques, he would have probably considered the training irrelevant.

This attitude could have affected his readiness for learning.

And a lack of readiness for learning can become a fatal habit. Have you locked yourself into that box?

The principle of exercise merely means repetition. Those things most often repeated are best remembered. Distributive reinforcement proves this. The problem is that most students either don't apply this principle because of a lack of readiness . . . or if they try, they apply it improperly.

For example, they apply it improperly by trying to repeat everything 100 times in a cram session the night before the exam. It would be much easier to maintain a higher and flatter retention curve by repeating the material during several short review sessions.

VISUAL	AUDIO
	Effect is the next principle. [The principle of effect merely states that learning is strengthened when accompanied by a pleasant or satisfying feeling and weakened when associated with an unpleasant feeling.] With this in mind we have produced the following graphic to aid your learning processes.
VT 3	
Black.	Bugle Call. (Sound effects record SEL-13-B, Track 3, first 3 seconds, Armed Forces Radio and Television Services, 1C15 North McCadden Pl., Los Angeles 38, California, 1964.)
 LS Fade in on LS of girl dancing.	Fade in background music for dance. ("Wild Weekend," by The Safaris, DOT Records Inc., Hollywood 23, California, 1963.)
 When dance established, slowly fade in a LS key of G 13 and zoom in until graphic covers the screen.	

VISUAL	AUDIO
Fade to black.	Fade out music.

△ 2 M (Fade in.)

Since we probably lost you right there, this is as good a time as any to apply some distributive reinforcement before you take the test. So if you aren't ready to apply the principle of readiness please sleep through the next few seconds.

VT 4

1 G odd | 2 G even

Background music.

(Begin after 10 second introduction on Production Music Library No. 3, Side 2, Cut 4. Record produced by Capital Records, Customs Division, 1016 North McCadden Pl., Los Angeles 38, California, no date.)

The first part of VT 4 is a review consisting of G 1 through G 12 alternating between camera #1 and #2. The odd numbered graphics were on camera #1. The even numbered graphics were on camera #2.

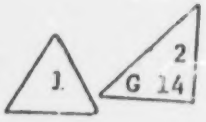
Fade to black after G 12.

Fade out music after G 12.

(Edit for set up on second part of VT 4)

VISUAL	AUDIO
Black	Bugle Call.
ML	(Sound effects record SEL-13-B, Track 3, first 3 seconds, Armed Forces Radio and Television Services, 1016 North McCadden Pl., Los Angeles 38, California, 1964.)
Fade in on ML view of dancing girl facing away from camera. She turns head toward camera.	No Sound.
When head turns, quickly fade in LS key of G 13 and fast zoom in until graphic covers screen.	
Cut to black.	

End VT 4



The fourth principle of learning is called primacy. It means that when something is a first experience it creates a strong impression.

Once something is learned, it is difficult to un-learn. This gets back to habits. If you use poor study habits, you're in a worse position than the person who has never learned any at all.

VISUAL	AUDIO
VT 5	
1 M	Frequency oscillator over background music to provide eric effect.
Frame M on still picture of bathing beauty. Begin from defocus, focus and make slow pan down and then up. Keep special effects generator in time with the beat of the music.	(Wild Weekend by The Safaris, DOT Records, Inc., Hollywood 28, California, 1963.)
Defocus at top of pan and then fade to black.	Fade sound.
1	
2 G 15	That probably didn't teach you anything, but it was meant to illustrate the principle of intensity. A vivid, dramatic, or exciting learning experience is more easily learned than a boring one. But whether or not you are ready to learn can do a lot to make an apparently boring class alive with excitement.
2 G 16	(5 sec. pause to view graphic, then cue talent to talk over graphic.)
	The sixth and final principal is perhaps best illustrated by the curve of retention. Other things being equal, the things most recently studied are best remembered.

VISUAL	AUDIO
1	Reviews before final exams and summaries at the end of lessons are good examples of how this principle is applied. And with this in mind we will provide you with a visual summary of the lesson so far. This is an example of the direct application of the principle of exercise and the principle of recency.
VT 6	
1 G odd / 2 G even The first part of VT 6 is a review consisting of G 4 through G 12 alternating between camera #1 and #2. Fade to black after G 12.	Background music. (Begin after 10 second introduction on Production Music Library No. 3, Side 2, Cut 4. Record produced by Capital Records, Customs Division, 1016 North McCadden Pl., Los Angeles 38, California, no date.) Fade out music after G 12
(Edit for set up on second part of VT 6)	
2 Fade in MC view of dancing girl smiling into camera.	No sound.
1 G 13 When shot is established key G 13 in to fill screen.	

VISUAL	AUDIO
Cut to black after a count of two.	
----------(Edit for set up on third part of VT 6)----------	
1 G 14 _____	Fade in background music.
2 G 15 _____	(Begin after 10 second introduction on Production Music Library No. 3, Side 2, Cut 4. Record produced by Capital Records, Customs Division, 1016 North McCadden Pl., Los Angeles 38, California, no date.)
1 G 16 _____	
Timed by reading each graphic before cutting to the next.	
Cut to black after G 16.	Fade out music after G 16.
---------- (End VT 6)----------	
1 ML-slow zoom to-MC	I have attempted to make you aware that if you are like most people, you do a very poor job of utilizing your talent for learning. There is an easier and more efficient way of approaching a school situation. The most important point is that you have to first admit this to yourself and then be motivated to do something about it. If you become motivated . . . you can begin to apply the principles of learning and distributive reinforcement to your specific learning situation. In other words . . . knowing vaguely about these principles is one thing, but applying them is something else again. The best students invariably

VISUAL

AUDIO

organize a program of study that demonstrates the principles in each individual learning activity. For example, the principles can be applied to reading, listening, note-taking, manual activities and any number of learning tasks.

2
G 17

(Transitional pause.)

To illustrate the principles in action we will look at the Three R system for learning through reading.

1
G 18

(Transitional pause.)

The first step is reconnaissance. (Pause.) The second read. (Pause.) And the third recall.

(Edit for set up)

1

2
G 19

MC

[Reconnaissance merely means a preliminary survey of the material to be read in order to determine the general plan. It does not mean that you read for details.] This step can be accomplished in a number of ways depending on how the author organized his material. Chapter topics and sub-topics can be reviewed . . . or most authors give the key sentence to a paragraph either at the beginning or end of the paragraph. Some authors make a practice of including summaries at specific intervals or at the end of chapters. If none of these aids are available, the reconnaissance step can be accomplished by the best method of all . . . scanning.

VISUAL

AUDIO

2
G 19

[The reconnaissance step should provide you with the general picture and the main ideas.]

The principles applied in this step would be readiness and primacy. If you are curious in the first place, this reconnaissance step should leave you with a few unanswered questions. This will help you work up a will to learn.

The reconnaissance step helps you to see the overall picture first. This should keep you from getting hung up on insignificant details. This would perhaps best illustrate application of the principle - - primacy.

VT 7 ---------- (Edit for VT) ----------

1
G 18

(No sound.)

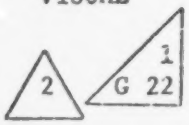
2
G 20

1
G 21

Timed by reading each graphic.

Cut to black.

VISUAL



AUDIO

The next step of the 3 R system is "read - - active reading with an open mind." If the mind is relaxed and the feet propped up on a chair with cold beer at hand, it is doubtful if the reading step will be of much use. Your mind must be active and willing to grapple with each new point. Without this active interest and willingness the student is wasting his time. Perhaps more than anything else, this step represents the principle of readiness in action. Unless you are really motivated, effort spent on so-called study is a waste of time.

VT 8 ---------- (Edit for VT) ----------

2
G 18 (No sound.)

1
G 19

2
G 20

Timed by reading each graphic.

Cut to black.

VISUAL	AUDIO
2 / 1 G 25 MC	⌊The final step of the 3 R system is recall. This is merely rephrasing in your own words what you have just read. It can be applied any time during the reading . . . at the end of a paragraph, topic or chapter. You can jot the ideas down on paper from memory. But this takes more time. It helps to repeat the ideas aloud.⌋
(Cut camera #1)	Recall is work because it requires thinking. And this is exactly why it works. Studies have demonstrated conclusively that students who actively practice the recall step make better scores on tests. The experiments have demonstrated that 50 percent of the time spent on the 3 R system should be devoted to the recall step. Many experts recommend more . . . even up to 70 percent.
1 Cut to MC	Depending on how an individual handles the recall step, it is possible to apply all of the principles of learning. For example, the principle of ⌊intensity may be applied from the way you put the author's meaning into your own words. Perhaps you will apply a vivid and direct experience⌋ of your own to his meaning. (Slight pause.)
2 G 26	
2 G 27	⌊Since we tend to remember only the good things, the bringing up of this old experience would help to apply the principle of effect.⌋ Learning is then a pleasant and satisfying experience.

VISUAL	AUDIO
	And of course, more than anything else the recall step applies the principle of exercise. This step provides one the opportunity to repeat and practice in many different ways the points that the author is trying to express.
VT 9	(Edit for VT)
1 G odd / 2 G even	(No sound.)
A visual review consisting of G 17 through G 28 alternating between camera #1 and #2. Timed by quickly reading each graphic, then cut to black.	
	(Edit for set up)
1 G 29	(No sound.)
2 G 26	
1 G 27	
2 G 28	

VISUAL

AUDIO

1
G 29

2
G 28

1
G 30

2
G 28

Cut from camera to camera as fast as graphics can be switched.

Cut to black.

----------(End of VT)----------

2

M

This concludes the lesson. Now we will summarize the points that were covered. This will be a living example of the application of the principles of recency and exercise. After the summary your monitor will pass out the written exam. The test begins with three opinion questions which will in no way be compromised. This portion of your exam will be scored separately without reference to your name. These opinion questions are merely designed to provide the audio-visual services with the feedback necessary to determine how you, our audience, accepts or rejects this block of instruction. So for the sake of other people who may have to view this program, please be candid.

VISUAL	AUDIO
Cut to MC	I enjoyed doing this lesson and hope it helps you. And like our young airman on the desert island, please remember that if you actually apply what you've learned here today . . . who knows!, you too may find a better and more efficient use for one of your talents.
(Cut to black.)	
----------(Edit for VT)----------	(Insert music after the visual of VT 10 is complete.)
	Background music.
The first part of VT 10 is a review consisting of G 1 through G 28 alternating between camera #1 and #2.	(Begin at introduction on Production Music Library No. 3, Side 2, Cut 4. Record produced by Capital Records, Customs Division, 1016 North McCaden Pl., Los Angeles 38, California, no date.)
Fade to black after G 28.	
---------- (Edit for visual insert only.) ----------	
Insert second part of VT 9.	(Music insert should end with the final graphic, G 28)
Cut to black.	Cut sound.
---------- (End of VT 10) ----------	

END OF PROGRAM

APPENDIX A-4

GRAPHICS

G 1

HOW TO STUDY

G 2

Forgetting

Distributive Reinforcement

Principles of Learning

3 R System for Reading

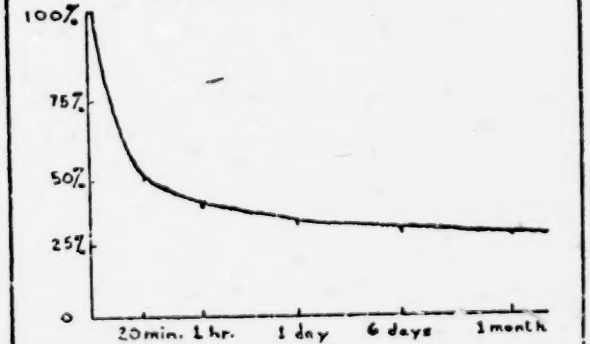
G 3

YOU WILL BE TESTED ON THIS MATERIAL

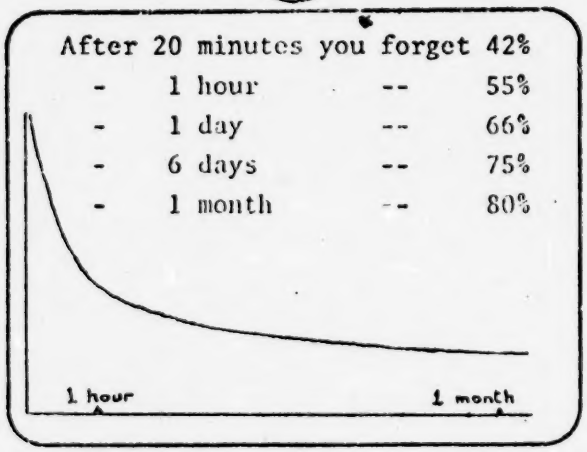
IMMEDIATELY FOLLOWING THE LESSON

G 4

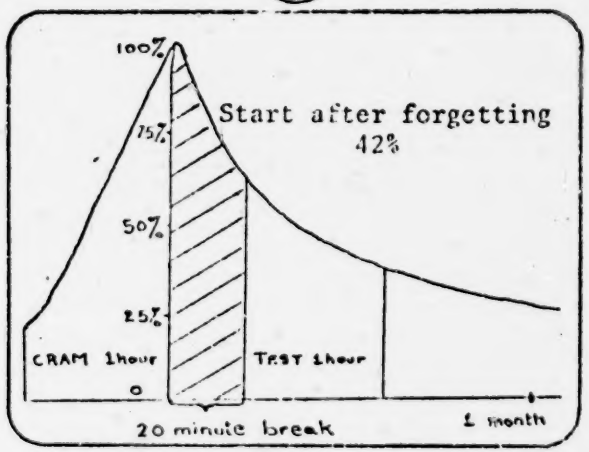
CURVE OF FORGETTING



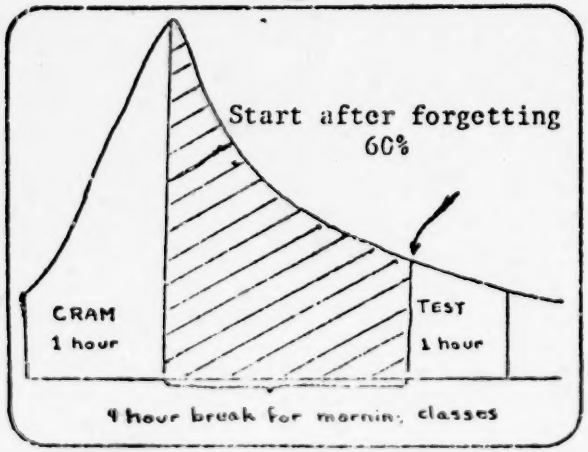
G 5


After 20 minutes you forget 42%
- 1 hour -- 55%
- 1 day -- 66%
- 6 days -- 75%
- 1 month -- 80%
1 hour
1 month

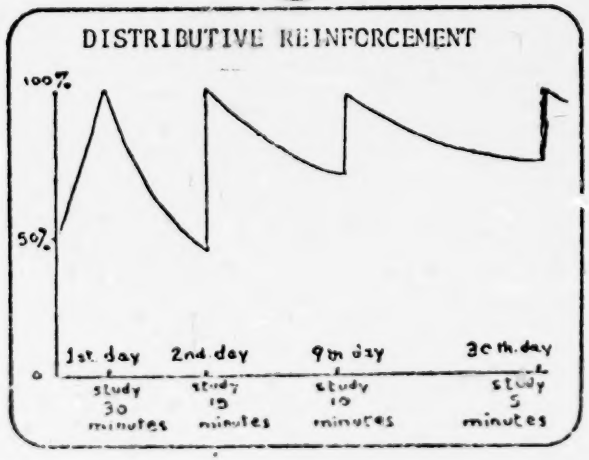
G 6


100%
75%
50%
25%
0
Start after forgetting
42%
CRAM 1hour
TEST 1hour
20 minute break
1 month

G 7


Start after forgetting
60%
CRAM
1 hour
TEST
1 hour
4 hour break for morning classes

G 8


DISTRIBUTIVE REINFORCEMENT
100%
50%
0
1st day
2nd day
9th day
30th day
study 30 minutes
study 15 minutes
study 10 minutes
study 5 minutes

G 9

The 6 Principles of Learning

G 10

1 readiness

2 exercise

3 effect

4 primacy

5 intensity

6 recency

G 11

1 READINESS

G 12

2 EXERCISE

G 13

3 EFFECT

G 14

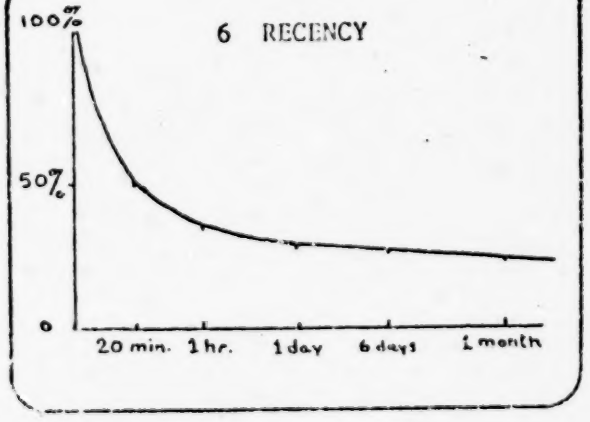
4 PRIMACY

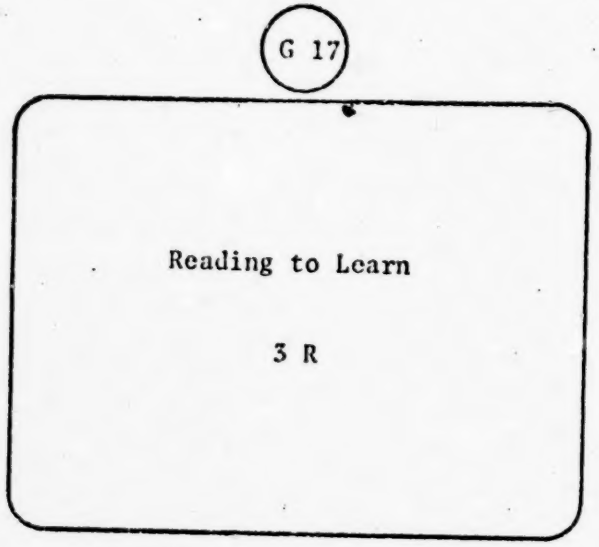
G 15

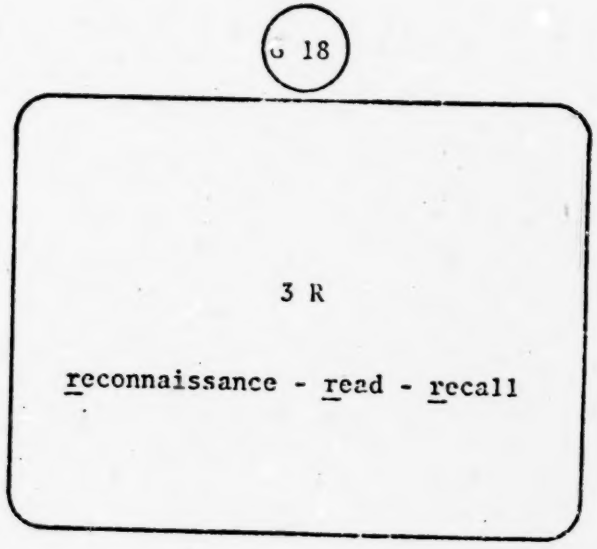
5 INTENSITY

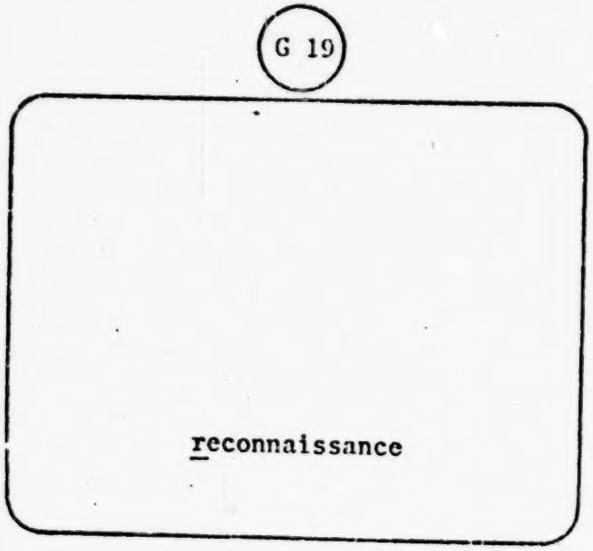
G 16

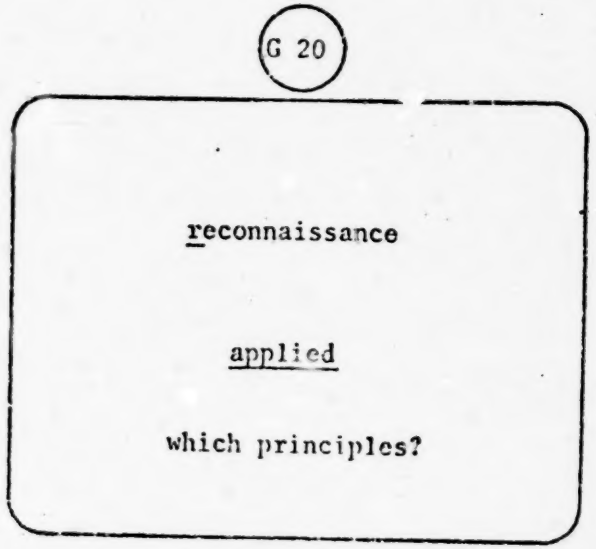
6 RECENCY

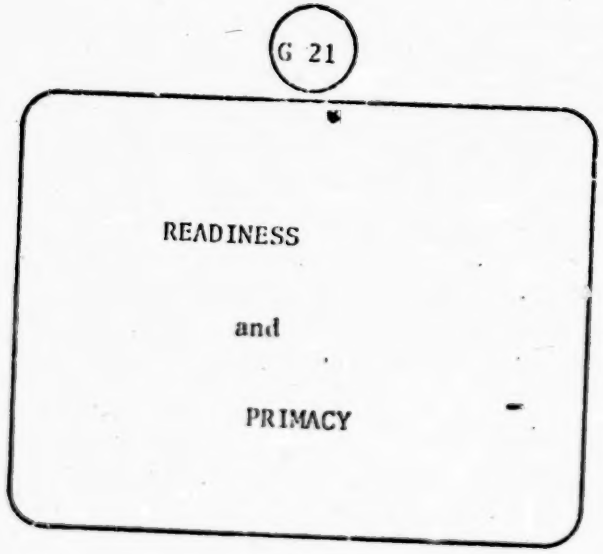


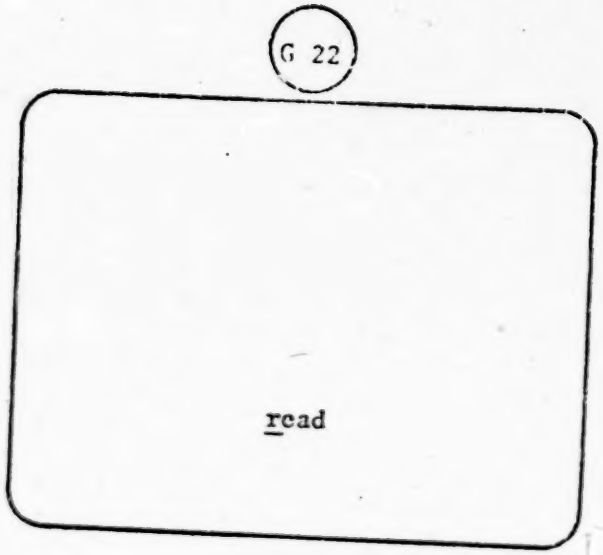

G 17
Reading to Learn
3 R

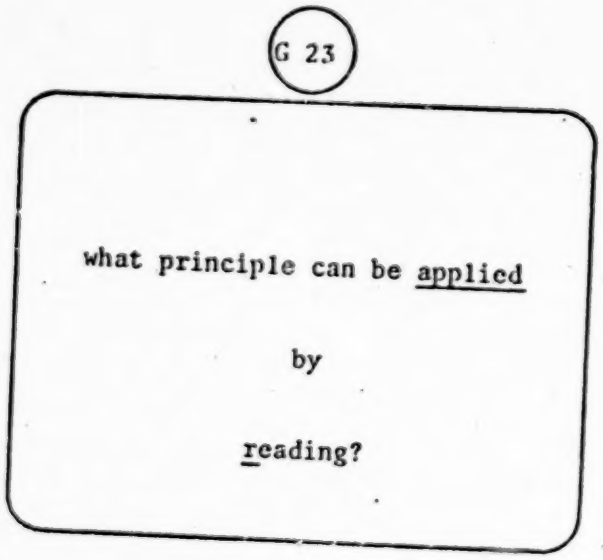

G 18
3 R
reconnaissance - read - recall

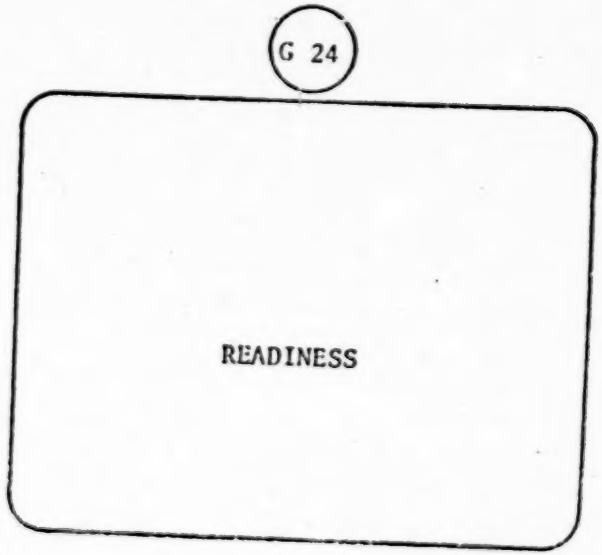

G 19
reconnaissance

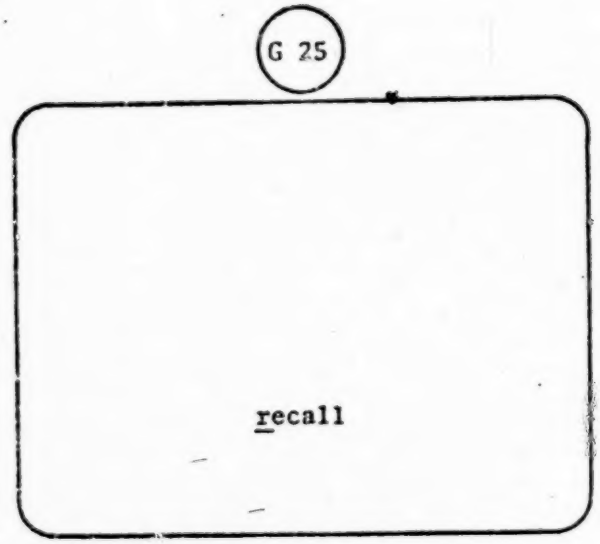

G 20
reconnaissance
applied
which principles?

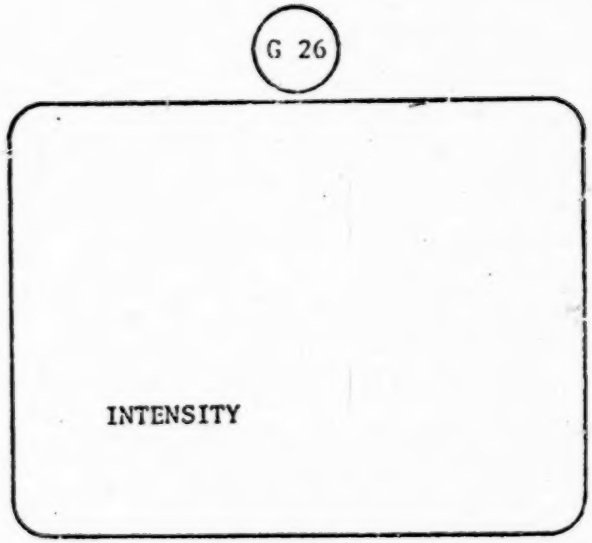

G 21
READINESS
and
PRIMACY

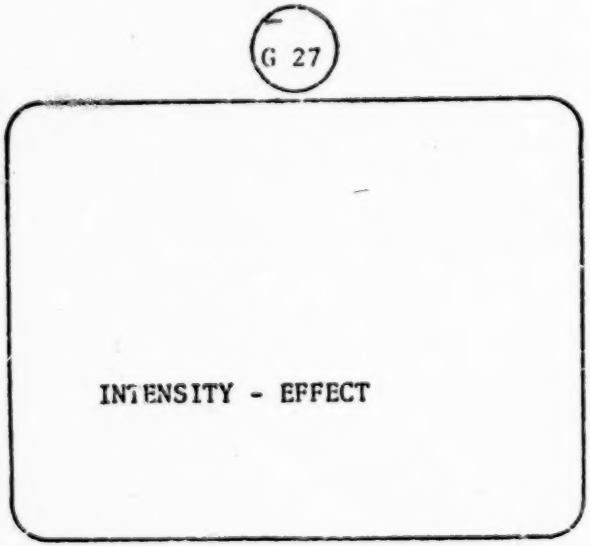

G 22
read

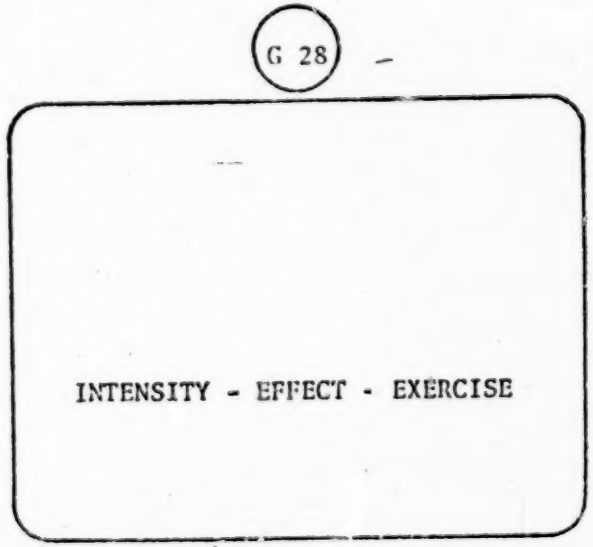

G 23
what principle can be applied
by
reading?

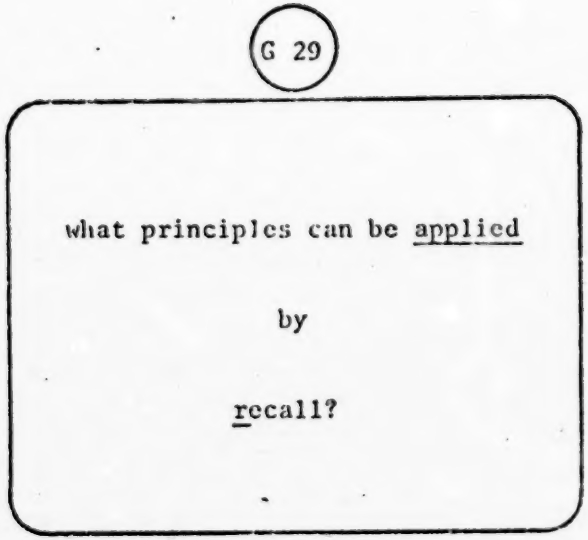

G 24
READINESS

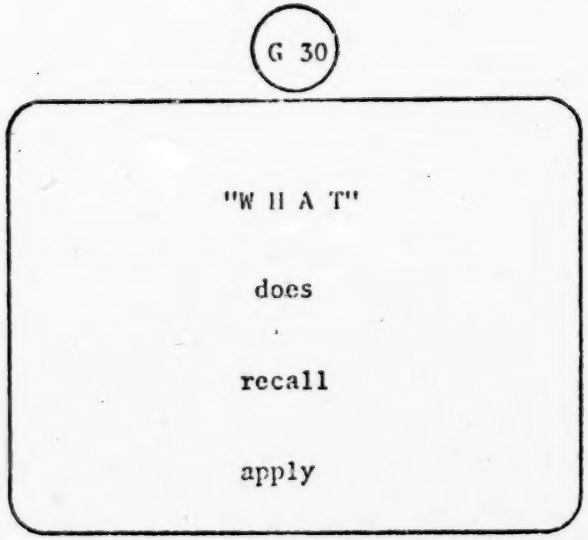

G 25
recall


G 26
INTENSITY


G 27
INTENSITY - EFFECT


G 28
INTENSITY - EFFECT - EXERCISE





*Graphics were created on 11 x 14 inch grey cards using black tempra for lettering and diagrams.

APPENDIX A-5

SET DIAGRAM

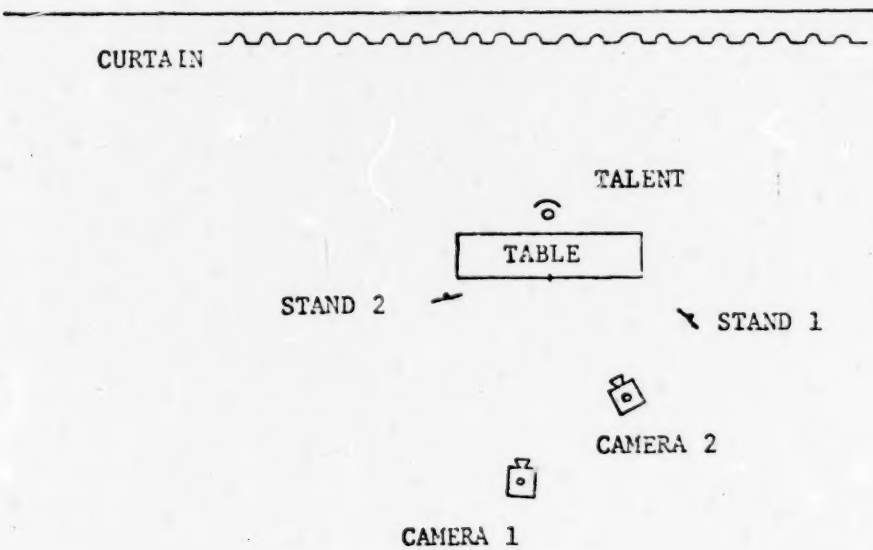


Figure 1

Set

Position: Placement of talent's chair, table, cameras and stands were marked with tape placed on the studio floor.

Curtain: Light gray color.

Table: 20" X 8' 3", black cloth cover, rear edge 9' from curtain and 10' from wall.

Center of camera 1: 11' from center front of table, 11' from center of card stand 2. Center of card stand 2 to center front of table was 4' 8".

Center of camera 2: 8' from center front of table and 6' from center of card stand 1. Center of card stand 1 to center of table was 8' 4".

Set lighting: 125 foot candles on talent.

APPENDIX A-6

EQUIPMENT

Cameras: Standard monochrome image orthicon studio cameras made by Sarkes Tarzin Co., Bloomington, Indiana.

Camera 1 lens: 40 - 400 mm variable focal zoom lens.

Camera 2 lenses: Standard studio lens compliment consisting of 2, 3, 5 and 8 inch lenses on a rotating turret.

Telepromptors: Each camera was fitted with a telepromptor controlled by the talent via a hidden cable. The telepromptors were made by Telepro Industries Inc., Cherry Hills, New Jersey.

APPENDIX B

PERCEPTUAL DISTORTION INDICATES

DIRECTIONS:

Items lettered A, B and C are opinion questions designed to provide the audio-visual services with the feedback necessary to produce a better product in the future. Please answer according to the way you honestly feel about the question. This portion of the test will be scored separately and without reference to your name or organization. Therefore, please mark the answers in the spaces provided for numbers 43, 44 and 45 on your answer sheet.

A. (Item number 43 on your answer sheet)

Teaching through television is one of the best methods of instruction!

a. agree strongly

b. agree

c. neither agree nor disagree

d. disagree

e. disagree strongly

B. (Item number 44 on your answer sheet)

The instructor was an outstanding teacher!

a. agree strongly

b. agree

c. neither agree nor disagree

d. disagree

e. disagree strongly

C. (Item number 45 on your answer sheet)

The subject material was extremely beneficial!

a. agree strongly

b. agree

c. neither agree nor disagree

d. disagree

e. disagree strongly

APPENDIX C

LEARNING TEST

Appendix C is divided into several sub-sections for the purpose of clarity. Appendix C-1 lists the desired learning objectives under the appropriate lesson goal. Appendix C-2 contains the characteristics of the test instrument. It includes sections on general characteristics, reliability, validity and item analysis. Appendix C-3 is the test instrument including correct answers.

APPENDIX C-1

LESSON GOALS AND DESIRED LEARNING OBJECTIVES

1.0 The first goal of this lesson is that each student should demonstrate knowledge of the curve of forgetting. The desired learning objective of this goal is that each student should:

1.1 Answer correctly multiple choice questions relating the percent of forgetting after twenty minutes and one month.

2.0 The second goal of this lesson is that each student should demonstrate knowledge of distributive reinforcement. The desired learning objectives of this goal are that each student should:

2.1 Identify correctly from a multiple choice question the most appropriate schedule for reviews and the most correct amount of time to spend on each review.

2.2 Answer correctly from a multiple choice question the most correct answer identifying the advantage of distributive reinforcement from an example provided in the lesson.

3.0 The third goal of this lesson is that each student should demonstrate knowledge of the principles of learning. The desired learning objectives of this goal are that each student should:

3.1 Identify correctly from multiple choice questions the most accurate list of principles of learning.

3.2 Identifying the correct principles of learning according to examples which were provided is the lesson and included in the stem of multiple choice questions.

4.0 The fourth goal of this lesson is that each student should demonstrate knowledge of the 3 - R system of learning through reading. The desired learning objectives of this goal are that each student should:

4.1 Identify correctly from a multiple choice question the most accurate list of the three steps appropriate to the 3 - R system of learning through reading.

4.2 Identify the correct statement appropriate to how a 3 - R step should be accomplished as originally provided in the lesson and paraphrased in the multiple choice question.

5.0 The fifth goal of this lesson is that each student should demonstrate knowledge of some relationships of the curve of forgetting, distributive reinforcement, principles of learning and the 3 - R system of learning through reading. The desired learning objectives of this goal are that each student should:

5.1 In an extended multiple choice question identify the appropriate items as belonging to the concept of distributive reinforcement, a set of principles of learning, or a system of application known as the 3 - R system of learning through reading.

6.0 The sixth goal of this lesson is that each student should demonstrate comprehension of some relationships of the curve of forgetting, distributive reinforcement, principles of learning and the 3 - R

system of learning through reading. The desired learning objectives of this goal are that each student should:

6.1 Identify the 3 - R steps and the most appropriate principles applicable to each step from multiple choice questions in which no examples are provided in the question.

6.2 From examples provided in the 3 - R section of the lesson and paraphrased in the stem of multiple choice questions, but without providing the 3 - R step, identify the principle of learning most appropriate to the 3 - R step.

6.3 From a list containing several pairs of terms from separate categories; i.e., distributive reinforcement, principles of learning and the 3 - R system of learning through reading; choose the terms most like each other.

7.0 The seventh goal of this lesson is that each student should demonstrate application of the concept of distributive reinforcement, the principles of learning, and the 3 - R system of learning through reading. The desired learning objectives of this goal are that each student should:

7.1 From a hypothetical example provided in the stem of a multiple choice question choose the most correct conclusion from answers that include both principles of learning and steps of the 3 - R system of learning through reading.

7.2 Choose the correct concept, principle or 3 - R step provided in the stem for several short hypothetical examples provided in the items of extended multiple choice questions.

7.3 Choose the correct concept, principle or 3 - R step for a hypothetical question supplied in the stem of that question.

APPENDIX C-2

CHARACTERISTICS OF TEST INSTRUMENT

General Characteristics of Test Instrument

The mean aggregate raw score was 22.29 for the forty-two item test. This was an arithmetic average of the total unweighted raw scores of the ninety subjects. The high, medium and low group means were similarly computed according to the three strata of thirty subjects each. The high stratum mean was 28.33. The medium stratum mean was 21.53. The low stratum mean was 11.27. These means were computed by the following mathematical notation:

$$\overline{x} = \frac{\sum_{i=1}^{i=n} x_1}{N}$$

The aggregate correct raw score range was 7 through 38. The high, medium and low strata ranges were 17 through 38, 14 through 37, and 8 through 15 respectively. The aggregate variance was 59.87. The variance was computed by the following mathematical notation:

$$s_x^2 = \sum_{i=1}^{N} \frac{(X_i - \overline{X})^2}{N},$$

X_i = individual raw score

$\overline{X}$ = test mean

N = number of subjects

The aggregate standard deviation was 7.74. The standard deviation was computed by the following mathematical notation:

$$s = \sqrt{\frac{(X_1 - X)^2}{N}}$$

The aggregate standard error of measurement was 2.908. The standard error of measurement was computed using the following mathematical notation:

$$r_{est} = s_t \sqrt{(1 - r_{tt})}$$

s_t = standard deviation

r_{tt} = reliability of the test

The mean aggregate biserial correlation was .485. The mean aggregate ease index was .531. These are merely arithmetic averages of the individual item biserial correlations and ease indexes. The formulas and meaning of these terms will be discussed in greater detail under the item analysis section. Estimated interitem correlation was .235. This is an index of the degree which different items on the test essentially measure the same thing. It is computed by squaring the mean biserial correlation. The interiten correlation means that there was approximately a 23.5 percent overlap in the subjects interpretation of the material measured on the test.

Reliability

The aggregate reliability was computed from the scores of ninety subjects on the final forty-two item test. This reliability estimate was .859. The reliability estimate for the high stratum of 30 subjects

was .787. The reliability estimate for the medium stratum of 30 subjects was .739. The reliability estimate for the low stratum of 30 subjects was .778. The mathematical notation for the Kuder-Richardson formula number 20 is as follows:

$$r_{tt} = \frac{N}{N - 1} \qquad \frac{1 - \sum_{i=1}^{N} p_i q_i}{2_{st}}$$

N = the number of test items

s_t = standard deviation of the test

p = percent passing a particular item

q = percent failing the same item

Validity

Validity was not measured against an external test. Evidence that the test was valid may be assumed from four sources.

First, the script was constructed from the lesson goals. Then the test items were constructed from desired learning objectives that logically followed the lesson goals and script. This represented an attempt to incorporate content validity into the test items.

Next, the ITEMANA computer program calculated an estimate of the test validity ceiling. Statistically, the validity coefficient cannot exceed the square root of the reliability coefficient. The maximum theoretical validity coefficient for the aggregate test was .927.

Third, the individual item point biserial correlations and their corresponding t-ratios provide an indication of item validity. This

will be discussed in greater detail in the item analysis section. But Table 12 indicates that all t-ratios were significant at or above the .05 level of confidence.

Finally, two instructors responsible for developing and teaching the how to study course at the Air Force Academy attested to the apparent face validity of the instrument.

Item Analysis

The following discussion corresponds to Table 12, Analysis by Item, columns one through eight. The table may be cross-referenced with the test instrument in Appendix C-3 and the lesson goals and desired learning objectives in Appendix C-1.

The first column merely contains a list of the appropriate test items. Columns two, three and four itemize the lesson goals, desired learning objectives and the level of achievement for each test item. Level of achievement is signified by K for knowledge, C for comprehension and A for application.

Column six lists the biserial correlation coefficient for each test item. This indicates the relationship between success on the individual item and success on the complete test. This discrimination index was calculated by the following mathematical notation:

$$r_{bis} = \frac{(\bar{X}_p - \bar{X}_q)}{S_x} \frac{pq}{f(x)},$$

$\bar{X}_p$ = mean score of subjects answering correctly

$\bar{X}_q$ = mean score of subjects answering incorrectly

p = item ease index

$f(x)$ = the y ordinate on the normal curve

S_x = standard deviation of the total test

Column seven contains the point biserial correlation of each test item. The point biserial correlation is similar to the biserial correlation in that it is an indication of the relationship between success on the question and success on the complete examination. It rests on a different set of assumptions and is a more conservative estimate of the relationship than the biserial correlation. The mathematical notation for calculating the point biserial correlation is as follows:

$$r_{p\ bis} = \frac{(\overline{X}_p - \overline{X}_q)\quad \sqrt{pq}}{S_x}$$

All terms defined under biserial formula

Column eight provides an estimate of the statistical significance of the point biserial correlation. Levels of significance were annotated at the bottom of Table 12. The mathematical notation for calculating the t-ratio is as follows:

$$t = r_{p\ bis}\ \frac{\sqrt{N-2}}{\sqrt{1 - (r_{p\ bis})^2}}$$

N = size of sample (90)

Table 17

Analysis by Item

(1) Item	(2) Goal	(3) Objective	(4) Level	(5) Base Index	(6) Biserial	(7) P Biserial	(8) T-Ratio
1	1.0	1.1	K	.689	.338	.258	2.502
2	1.0	1.1	K	.533	.466	.372	3.756
3	2.0	2.1	K	.311	.467	.356	3.579
4	2.0	2.2	K	.589	.545	.431	4.481
5	3.0	3.1	K	.500	.612	.488	5.248
6	3.0	3.1	K	.556	.515	.409	4.205
7	3.0	3.2	K	.744	.637	.470	4.990
8	3.0	3.2	K	.378	.552	.433	4.506
9	3.0	3.2	K	.500	.317	.253	2.450
10	3.0	3.2	K	.822	.389	.265	2.581
11	4.0	4.1	K	.589	.553	.437	4.556
12	4.0	4.2	K	.567	.417	.331	3.292
13	4.0	4.2	K	.333	.270	.208	1.996
14	6.0	6.1	C	.589	.685	.542	6.049
15	6.0	6.1	C	.367	.551	.430	4.474
16	6.0	6.1	C	.444	.623	.495	5.351
17	6.0	6.2	C	.389	.445	.350	3.507
18	6.0	6.2	C	.411	.455	.360	3.618
19	5.0	5.1	K	.500	.641	.511	5.580
20	5.0	5.1	K	.444	.412	.328	3.255
21	5.0	5.1	K	.500	.421	.336	3.347
22	5.0	5.1	K	.556	.704	.559	6.330
23	5.0	5.1	K	.289	.662	.499	5.401
24	5.0	5.1	K	.767	.333	.241	2.332
25	5.0	5.1	K	.478	.575	.459	4.843
26	5.0	5.1	K	.589	.571	.451	4.746
27	5.0	5.1	K	.422	.569	.451	4.736
28	5.0	5.1	K	.522	.474	.378	3.828
29	7.0	7.1	A	.311	.386	.294	2.890
30	6.0	6.3	C	.356	.354	.275	2.686
31	7.0	7.2	A	.667	.473	.365	3.672
32	7.0	7.2	A	.789	.340	.241	2.329
33	7.0	7.2	A	.589	.678	.536	5.957
34	7.0	7.2	A	.356	.284	.221	2.128
35	7.0	7.2	A	.456	.450	.358	3.597
36	7.0	7.2	A	.722	.506	.379	3.842
37	7.0	7.2	A	.567	.534	.424	4.390
38	7.0	7.2	A	.611	.274	.215	2.069
39	7.0	7.2	A	.678	.518	.398	4.064
40	7.0	7.2	A	.622	.585	.459	4.841
41	7.0	7.2	A	.633	.505	.395	4.033
42	7.0	7.3	A	.556	.278	.221	2.128

Critical value of $t_{.05}$ = 2.00, $t_{.01}$ = 2.660, $t_{.001}$ = 3.460

K = Knowledge, C = Comprehension, A = Application

APPENDIX C-3

TEST INSTRUMENT

1. According to the curve of forgetting, how much does the average person forget after twenty minutes?

   a. 20%

   b. 25%

   c. 34%

   -d. 42%

2. How much does the average person forget after one month?

   a. 75%

   -b. 80%

   c. 85%

   d. 90%

3. Which is the <u>most</u> correct statement about distributive reinforcement?

   a. The review periods should be regularly scheduled.

   b. The first and last review should be the longest review periods.

   c. The final review should occur the night before the exam.

   -d. The first review should be the longest.

4. Which is the most correct statement about the advantages of distributive reinforcement?

   -a. Distributive reinforcement works because the rate of forgetting decreases after each review.

   b. Distributive reinforcement works because repetition helps the memory.

   c. Distributive reinforcement works because it produces good study habits.

   d. Distributive reinforcement works because it forces one to apply the correct principles of learning.

5. Which list includes only principles of learning?

   a. readiness, exercise, effort, recency.

   -b. exercise, primacy, intensity, recency.

   c. intensity, recall, readiness, primacy.

   d. effect, review, readiness, intensity.

6. Which list includes only principles of learning?

   a. readiness - review.

   b. review - primacy.

   c. intensity - recall.

   -d. none of the above.

7. What principle of learning has more to do with your attitude toward learning than any of the other principles?

   a. intensity.

   b. recall.

   -c. readiness.

   d. exercise.

8. What principle of learning is mostly concerned with repetition?

   a. recall

   -b. exercise

   c. review

   d. primacy

9. What principle of learning is associated with pleasant feelings or emotions?

   a. readiness

   b. intensity

   c. primacy

   -d. effect

10. A willingness and desire to learn is perhaps best associated with what principle of learning?

   a. effect

   b. exercise

   c. recall

   -d. readiness

11. The 3 - R system for learning through reading refers to which of the following lists of terms?

   -a. recall - reconnaissance - read

   b. read - reconnaissance - recency

   c. review - reconnaissance - read

   d. readiness - read - review

12. When is the best time to apply recall?

   -a. Any time.

   b. At the end of a chapter.

   c. At the end of a lecture.

   d. At the end of a paragraph.

13. According to the experiments cited in the lesson, which is the most correct statement about how much time should be spent on recall?

    a. 25%

    b. 35%

    c. 45%

    -d. 55%

14. Which principles of learning are usually applied when using the first step of the 3 - R system?

    -a. readiness and primacy

    b. reconnaissance and recall

    c. recency and effect

    d. recall and readiness

15. Which principle of learning is perhaps easiest to apply when using the second step of the 3 - R system?

    a. recall

    b. recency

    -c. readiness

    d. reconnaissance

16. What principles of learning are probably the easiest to apply when using the third step of the 3 - R system?

    a. exercise, effect, and recall

    b. intensity, effect, and recall

    c. readiness, primacy, and intensity

    -d. effect, intensity, and exercise

17. Scanning topic headings, chapter headings and summaries may result in raising some curiosity on the part of the reader. This curiosity is closely associated with which principle of learning?

a. recency

b. recall

c. effect

-d. readiness

18. Humans have a tendency to remember the good experiences and forget those that were unpleasant. Thus, when a student associates a personal experience with an author's communication, it usually means that the student may be applying which principle of learning?

-a. effect

b. recall

c. primacy

d. intensity

DIRECTIONS: In the televised lesson, you were provided with a concept, some principles, and a system of application to aid your study habits. In the test items number 19 through 28 below, please indicate whether the term belongs with a concept, principle, system, or none of the three.

19. reconnaissance

a. concept

b. principle

-c. system

d. none of the above

20. curve of forgetting

-a. concept

b. principle

c. system

d. none of the above

21. recency

a. concept

-b. principle

c. system

d. none of the above

22. intensity

a. concept

-b. principle

c. system

d. none of the above

23. distributive reinforcement

-a. concept

b. principle

c. system

d. none of the above

24. Ebbinghouse

a. concept

b. principle

c. system

-d. none of the above

25. recall

a. concept

b. principle

-c. system

d. none of the above

26. effect

a. concept

-b. principle

c. system

d. none of the above

27. reading

a. concept

b. principle

-c. system

d. none of the above

28. exercise

a. concept

-b. principle

c. system

d. none of the above

DIRECTIONS: Read the paragraph below and then choose the conclusion most appropriate to what you have learned about studying.

Bill would never study until the night before an exam. Then he would cram. He seemed to get away with it.

29. Which conclusion is most appropriate to what you have learned about studying?

a. More than any thing else, Bill was probably applying recall in his study habits.

b. More than any thing else, Bill was probably using reconnaissance as an aid to his study habits.

-c. More than any thing else, Bill was probably applying recency as an aid to his study habits.

d. More than any thing else, Bill was probably using primacy as an aid to his study habits.

30. Which pair of items is most like each other?

a. reconnaissance - primacy

-b. recall - exercise

c. curve of retention - recency

d. readiness - effect

DIRECTIONS: In the following items, question number 31 through number 37, you are to judge what is most appropriate to correct the situation from the list of terms below. Each term may be used once, more than once, or not at all.

a. distributive reinforcement

b. reconnaissance

c. effect

d. recency

a 31. Jerry has a hard time remembering.

c 32. Bob cannot stand the hot, drab, and dirty classroom.

b 33. Jose always gets too involved in details.

d 34. Hank has a test tomorrow

d 35. The instructor always gives a pop quiz over the previous day's notes.

a 36. Bob is smart, but he just cannot seem to get organized.

a 37. Jerry always makes average grades by cramming right up to exam time.

DIRECTIONS: In the following items, questions number 38 through number 41, you are to judge what conclusion is most appropriate to the situation. Each conclusion may be used once, more than once, or not at all.

Conclusions

a. The situation would probably be true if distributive reinforcement had been used.

b. The situation would probably be true if readiness had been applied.

c. The situation would probably be true if effect had been applied.

d. The situation would probably be true if intensity had been applied.

a 38. This student made excellent grades without seeming to put any more time at studying than the average person.

b 39. This student always seemed eager to learn about new things.

c 40. This class liked the instructor.

a 41. This student did well although the one final exam counted for the entire course grade.

42. Why should the Air Force prefer to train only volunteers for jobs such as para-medics and pilots?

a. primacy

*b. distributive reinforcement

c. effect

-d. readiness

END

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